

CHALK RIVER GRAPHICS

CrgSim CDU and FMC

Installation and User's Guide

Chalk River Graphics

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Forward

CrgSim provides the ability to display two “real life” sized Primary Flight Displays (PFD), two Nav Displays (ND), one EICAS Display and one CDU for users of Flight Simulator X. One set of a PFD and Nav for the Captain, one set of a PFD and Nav for the First Officer, and one shared EICAS. The instruments may be run on a different computer (or computers) than the one the simulator is executing on.

The **Control Display Unit (CDU)** is the interface device used by the Pilot and First Officer to communicate with the Flight Management Computer (FMC). The following pages describe how to use the CDU to build flight plans and to monitor the progress of the flight.

So for step number ONE if you have not already done so download the CrgSim distribution zip file. Read the included documentation and install the components from that package that you want to run.

Please read all the documentation from the main instrument distribution package.

If you find a problem with the software please let us know. The web site is at www.crgsim.com. It is read-only since we ran out of time trying to clear the spam from the site. We can be reached at sim30@crgsim.com

Thanks and enjoy.



The CrgSim CDU

The CDU on the previous page consists of:

- a display screen in the upper center part of the unit
- a set of numeric keys on the lower left
- a set of alphabetic keys on the lower right
- and a set of selector keys on each side of the display.

As an example on how to use the keys lets start a flight plan that goes from Colorado Springs (KCOS) to Denver, Colorado (KDEN).

- Press the RTE function key. This will cause the unit to display a screen similar to one on the previous page.
- Use the alpha keys to enter KCOS. The letters will appear on the lowest part of the screen in an area called the scratchpad.
- After you have entered KCOS press the selector key on the left beside the text "ORIGIN". This action copies the text KCOS into the ORIGIN field and clears the scratchpad.
- Now enter KDEN on the scratchpad and press the selector key besides the text "DEST. This action copies the KDEN text into the DEST field and clears the scratch pad.

You have just created a simple flight plan for a Colorado Springs, Colorado to Denver, Colorado.

Since we may want to have more than one flight plan between these two cities we can give this flight plan a short descriptive word.

Key in TEST (or any other 5 letters you wish to use) and then press the selector key on the right by the text DESC. This word will be used in the name of the flight plan when it is saved.

You can also add a flight number to the flight plan. For this example we will call it CS001. So enter CS001 on the scratchpad and then press the selector button next to the word FLT NO. The Flight No. will also be saved with the flight plan.

This is a good time to save the flight plan. Just press the selector on the left side of the screen next to the word "<SAVE. The flight plan will be save with a file name of KCOS KDEN TEST.fpf.

CDU Keyboard

There are selector buttons on each side of the screen. The purpose of the selector buttons is determined by the text, if any, appearing on the screen adjacent to the selector button.

Below the screen are buttons that perform additional screen navigation. For example, when a screen has more than one page the "PREV PAGE" and "NEXT PAGE" buttons are used to switch between the pages.

The following keys are inactive at this time: CLB, CRZ, DES, DEP-ARR, HOLD and N1 LIMIT. Pressing them has no effect.

At the bottom of the screen is the scratchpad. When the numeric or alpha keys are pressed the key pressed is displayed on the scratch pad line.

When it is necessary to enter text into a field on the screen the data are first entered on the scratchpad and then transferred to the screen field by pressing the selector button next to the screen data field.

The buttons on the left of the screen are numbered from the top as 1 to 6 . The top left button is called LSK1 (left selector key 1) and the bottom left button is called LSK6.

The same numbering system is used for the right buttons. The top right button is RSK1 (right selector key 1) and the lower right button is RSK6.

CrgSim CDU Installation

The CrgSim directory is created when you unzip the distribution file. Within this new directory is a folder called “CDULeft” that will contain the executable “cduleft.exe”.

Like the rest of the CrgSim instruments the CDU will run on other computers on your network depending on the version of O.S. and the type of display card in the computer. Just copy the CDU folder to another computer and start the program CDULEft.exe that is located inside the folder. It should automatically find and connect with the Communications Manager.

Flight Plans

The flight plans created with the CrgSim CDU consist of a sequence of waypoints. The first waypoint is the origination airport. The last waypoint is the destination airport. Additional waypoints between the source and destination airports are optional. They define the path the aircraft is to fly between the origination and destination airport.

The entry of the origination and destination airports is described below in the “**Start A New Flight Plan**” section.

Flight plans may be saved and/or exported to FSX.

Flight Plan Names in CrgSim

A CrgSim flight plan file name consists of 3 parts each separated by a space. The first part of the name is the ICAO designation of the originating airport. The second part of the name is the destination airport ICAO designation. The third part of the name is an optional 5 characters to help describe the purpose of the flight plan (for example: IFR, VFR, or any other 5 chars.)

The PROGRESS Screen

The PROGRESS screen is used to keep track of the aircraft as it follows the flight plan. Press the PROG key to start the progress screen. It will look similar to the image below:



The NAV DATA Screen

The NAV DATA screen is used to review waypoints, nav aids, and airports that are in the database. To navigate to the NAV DATA screen:

- press the INIT REF key
- press the selection key next to NAV DATA>

To look at specif entries enter the ID and select the appropriate location type. If you do not know the type use the NAV POINT selection. The system will lookup all entries with the name you entered.



The Airport Info Screen

To look at airport information, enter on the scratchpad the airport you are interested in. As an example lets use KDEN.

After entering the airport ICAO code press the selection key next to <AIRPORT ID.

The airport info screen for KDEN appears:



From this screen you can look at the runways and frequencies available at the airport.

Runways Screen

To view airport runways select <RWYS on the Airport Info screen above. This will display a list of runways, their length in feet and meters, and the ILS frequency for each runway (if one exists) at the airport.



The image shows a screen titled "KDEN RUNWAYS" with a page indicator "1/3" in the top right corner. The screen displays a list of runways with their identifiers, lengths in feet and meters, and ILS frequencies. At the bottom, there is a "<RETURN" option.

KDEN RUNWAYS			1/3
RWY 16R			
16019 FT	4882 M	ILS 160.190	
RWY 34L			
16019 FT	4882 M	ILS 160.190	
RWY 16L			
12013 FT	3661 M	ILS 120.130	
RWY 34R			
12013 FT	3661 M	ILS 120.130	
RWY 17R			
12013 FT	3661 M	ILS 120.130	
<RETURN			

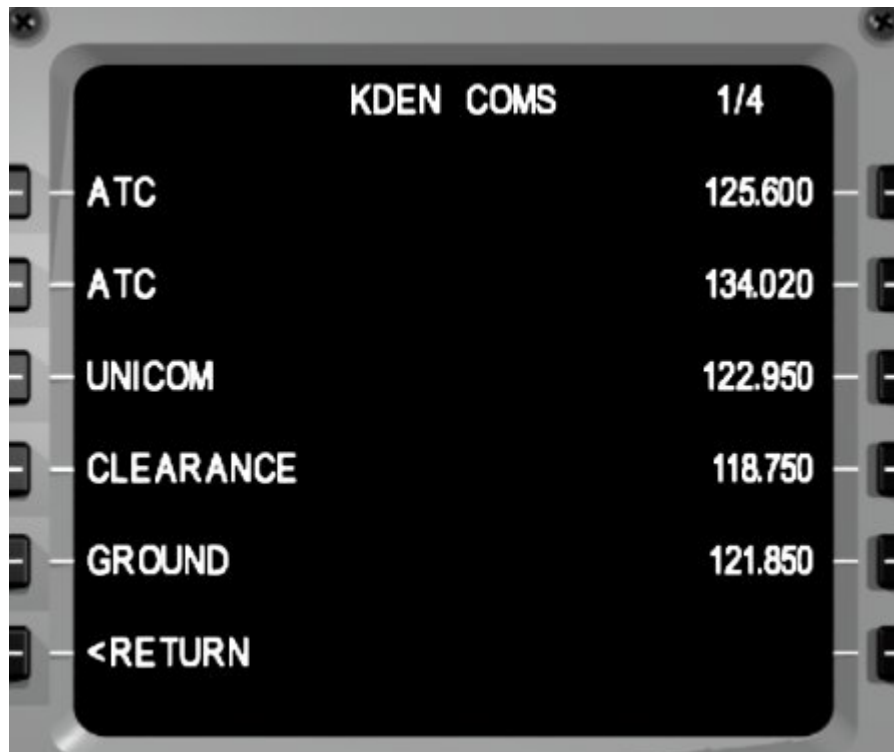
The page number 1/3 indicates that there are two more pages of runways. Use the **NEXT PAGE** and **PRE PAGE** to navigate to the other runway pages.

To go back to the Airport Info screen select <RETURN.

COMS Screen

To look at the communications frequencies available at the airport, from the runways screen press <RETURN and then select <COMS.

The COMS page displays the available frequencies at the selected airport and the function of each frequency. The screen for KDEN looks like:



The page number 1/4 indicates that there are three more pages of communications frequencies for this airport. Use the **NEXT PAGE** and **PREV PAGE** to navigate to the other coms pages.

Available CDU Actions

The next sections describe the actions available on the CrgSim CDU.

Save A Flight Plan

To save a flight plan:

- Press the RTE key.
- Select the “SAVE” selection key.

The flight plan is saved with a name described above.

Start A New Flight Plan

- Press the RTE key
- Enter the starting airport ICAO designation on the scratchpad
- Press LSK1 (Below “ORIGIN”) to transfer the airport name from the scratch pad to the ORIGIN field.

The entry of the ORIGIN airport will cause any current flight plan to be erased and a new one started with your origination airport.

Enter your destination airport ICAO code. And press RSK1 (below “DEST”).

You now have a valid flight plan consisting with a source and destination airport.

The SAVE option has been turned on in case you want to save your new flight plan.

Add Waypoints to a Flight Plan

Waypoints can be added between the origination airport and the destination airport. They cannot be added before the origination airport or after the destination airport. To add waypoints to a flight plan:

- Press the LEGS key
- enter the new waypoint on the scratch pad
- find the waypoint on the screen that you wish to add the new waypoint before. Press the selector button on this waypoint.
- The new waypoint will be added before the waypoint selected above.

Add Speed and Altitude to Waypoints

A speed and altitude can be associated with each waypoint. To add a speed enter the speed on the scratchpad followed by the letter S and then press the selector key next to the waypoint. The waypoint will now show the speed for the waypoint. The line below is an example of a speed of 250 kts as it appears on the scratchpad:

250S

Altitudes are entered the same way except that each altitude is followed by the letter A: The following line defines an altitude of 10,000 feet:

10000A

Waypoint speeds and altitudes are saved with the flight plan.

Adding a Flight Number

A Flight Number is optional but many will probably want to associate a flight number with the flight plan they have loaded. To add a flight number:

- click on **RTE**
- enter the flight number on the scratchpad
- click on RSK2 to enter the flight number

The flight number is save with the flight plan.

Clearing a Flight Plan

To remove a flight plan from the CrgSim system:

Select **MENU**

Select CrgSim Options.

Click on the selection key next to **<CLEAR**.

This will not delete the flight plan file from disk.

Delete a Flight Plan File From Disk

- Press the “INIT REF” key.
- Press the selection key next to NAV DATA>
- Press the selection key next to FLT PLANS> This will cause the available flight plan files to appear. If there are more than 1 page of them you can page through all of the flight plans with the PREV PAGE and NEXT PAGE keys.
- Press the DEL key on the bottom row of alpha keys. This will cause the word DELETE to appear on the scratchpad.
- Now press the selection key next to the flight plan file you wish to be deleted. Be sure you have selected the correct flight plan. This is a permanent delete.

Loading a Flight Plan

Flight Plans previously saved can be loaded by:

- pressing the **INIT REF** button
- click on the selector button by **NAV DATA>** (RSK1)
- click on **FLT PLANS>** (RSK3)

You will now see the flight plans you have saved. If there are more than 5 saved flight plans you can press **PREV PAGE** or **NEXT PAGE** to see other pages of flight plans. Find the flight plan you wish to load and:

- click on the selector button next to it. This will transfer the flight plan file name to the scratchpad.
- Click on the **RTE** button
- click on LSK2 to move the flight plan file name to the **CO ROUTE** field (Company route). The flight plan will then be automatically loaded.

Activating a Flight Plan

Once you have a flight plan complete and ready to fly it is necessary to activate it so it will display on the CrgSim Nav Display and be available if you want the aircraft to automatically follow the flight plan. To activate:

- click on the **RTE** key
- click on RSK5 (**ACTIVATE>**).

If you have the CrgSim Nav Display instrument turned on and are located somewhere near the flight plan path you will see the flight plan path in magenta on the Nav Display.

Adding Radio Frequencies to Waypoints

CrgSim has the ability to automatically tune your radios according to the frequencies associated with each waypoint. The waypoint frequency definitions are optional. To add a frequency:

- select LEGS
- Click on the selector button on the right side of the waypoint you wish to add one or more frequencies to
- enter the frequency on the scratchpad
- click on the selector key next to the radio you wish to tune

The Com and Nav frequency range is divided into channels. If the frequency you entered is not on an exact channel frequency the frequency will be moved to the closest channel.

Radio frequencies are saved with the flight plan.

Adding OBS Settings to the Waypoints

OBS settings can be added to waypoints in the same way as radio frequencies. Just navigate to the radio frequency page (see above) and enter the OBS setting on the scratchpad and then click on the selector button next to the OBS you wish to set.

Reviewing the Flight Plan on the Nav Display.

You can review the flight plan on the CrgSim Nav Display. To do so make sure that:

- Your flight simulator is running
- CrgSim.exe is started
- The CrgSim Communications Manager is running
- One or more of the Nav Displays are operating
- The Nav Display has the Plan Mode selected
- The flight plan has been activated

Then:

- click on MENU
- click on CrgSim **OPTIONS>**
- Click on **<FP REVIEW**

Now the waypoint you select on the CDU should appear at the center of the NAV Display. Adjust the range of the Nav Display to best display the flight plan path.

If you intend to fly the flight plan be sure to select the first waypoint before leaving the **<FP REVIEW** CDU page.

Change the Next Waypoint While Flying

To change the waypoint you are flying to or to change the waypoint that the aircraft is automatically flying to:

- click on MENU
- click on the selector by CRGSIM>
- click on the selector button by <FP REVIEW
- click on the desired waypoint. The waypoint name will appear on the right side of the screen in position 6.
- Press the selection key next to the waypoint in position 6. This will cause the waypoint to be selected as the target waypoint in the flight plan.

The aircraft will not fly directly to the waypoint. Instead it will attempt to fly to a point about 10 NM from the target waypoint in the direction of the previous waypoint. As the aircraft approaches the path it will gradually turn to point to the new target waypoint.

Importing FSX Flight Plans

Copy the FSX format flight plan you wish to import into CrgSim into the CDULeft\Flight Plans directory.

Press the MENU button.

Press the selection key on the left side of the screen next to <FP IMPORT. This will cause the display to show all of the files ending in .PLN.

Press the selection key next to the flight plan you wish to import.

Exporting Flight Plans to FSX

Flight Plans can be exported to FSX.

- Press the MENU key.
- Press the selection button on the right side of the screen next to CRGSIM>
- Press the selection key on the left of the screen next to <FP EXPORT. That is all you need to do. The exported flight plan will be in the CDULeft\Flight Plans directory.

Adding a Custom Waypoint

The FIX Function Key in the CrgSim CDU is used solely to maintain your custom waypoint inventory.

There are a huge number of waypoints in the world and the chances of wanting to use a waypoint that is not in the data base is high. The solution to that is simple, just add a waypoint to your personal collection of waypoints. Here is how to do that:

Press the FIX key

Enter the waypoint you wish to add on the scratchpad.

Press the selector button on the left side under the text WAYPOINT ID

Then enter the latitude of the waypoint.

The letters in the formats below are defined as:

- H = Hemisphere: S = Southern, N = Northern
- L = longitude direction: W = west of the prime meridian, E = East of the prime meridian.
- D = degrees
- M = Minutes
- S - seconds

Examples:

Degrees in decimal format (22.5 = 22 degrees and 30 minutes)

H d.dddd	N 2.35746
H dd.ddd	S 36.3625
H ddd.ddd	S 120.0

The space after the hemisphere designation is optional:

N34.5729 is a valid entry.

Entry with degrees, minutes, and seconds:

H D M S.SS	N 5 5 5
H DD M S.SSS	S 36 22 16.765
H DDD MMS	S 111 0 59.779

The space after the hemisphere designation is optional:

Formats for longitude are the same except the hemisphere designator is replaced by a W or E.

This is fussy work and mistakes are easy to make.

If you discover a mistake just reenter the value and press the appropriate selection key.

Each waypoint name may only exist once in your personal waypoint data base.

To correct or change a waypoint that is in your database just enter it on the scratchpad and press the WAYPOINT ID selection key. The waypoint and the latitude and longitude will be displayed. If needed, make a correction and press the <SAVE selection button.

If you want to keep the new or modified waypoint be sure to select <SAVE.

The waypoint latitude and longitudes are displayed on screen as degrees followed by decimal minutes from 0.0 to 59.99. The value is preceded by a N or S for latitudes and E or W for longitudes.

Command the Aircraft to Automatically Follow the Flight Plan

CrgSim has the ability to automatically follow the flight plan, set aircraft speeds to match each waypoint, climb or descend to the altitude associated with each waypoint, and to tune the radios according to the flight plan specification.

Make sure all systems are operational and running:

- Flight Simulator
- CrgSim sim interface
- CrgSim communications manager
- Selected CrgSim instruments.
- Aircraft is located at origination airport
- Flight plan has been activated
- Auto pilot is turned OFF

Then:

Select MENU on the CDU

Select CRGSIM OPTIONS>

If VNAV is OFF click on the selector key next to it to turn it ON

If LNAV is OFF click on the selector key next to it to turn it ON

Takeoff as you would normally do. When the aircraft reaches sufficient speed and height (about 500 feet) the **ALT HOLD** and **HDG SEL** buttons on the 737 MCP will illuminate. When this happens turn autopilot to ON and the aircraft should begin to follow the flight plan.

Config File

On startup cduleft.exe looks for a configuration file in the same directory. If it finds a file named cduleft.cfg it will open the file and read the contained parameter values.

Instrument size and location can be specified in the configuration file cduleft.cfg.

The CDU program uses winx, winy, height, and width - the same as the instruments in the main distribution.

You can configure the CDU by clicking on the CDU display and then pressing the F2 key. The setup display lets you set the CDU size and CDU location. To make the selections permanent press the F3 key.

When making large changes in the CDU size (after saving the selections with F3) it will be necessary to close and restart the CDU program to properly size the CDU, this is done automatically.

Contact

You can contact us at sim30@crgsim.com. We are especially interested in your comments, any problems you might have with the programs, and things that you like (or don't like) about them.

After spending a large amount of time removing non-flight sim posts (drugs, counterfeit boots, ... for sale) we reluctantly had to convert the web site to read only.