



Introduction

The **CDU/FMS** generates flight plan information for the Glass Cockpit, controls **LNAV** and **VNAV** on the **MCP**, they all read and write data to the flight simulator and interact just like their counterparts on a real aircraft.

This text is about the aircraft-specific data you will be able to customize for the various types you are flying.

One of the FMC subfolders (/Types) holds aircraft specific information which can be edited by the user.

Basics

The Aircraft Configuration Files are used by the CDU/FMS and the Glass Cockpit. They have the extension .TXT for your convenience, and they can be edited with any text editor.

Glass Cockpit Only

If you do **not** have the CDU/FMS software, the Aircraft Configuration file is referenced within PFD.INI. I.e. you would have an entry `Type=B737400.TXT` to reference the file for the B737-400. This file is loaded only once, when the Glass Cockpit is started.

Glass Cockpit with CDU/FMS

If you use the CDU/FMS software, things are different.

First of all, edit PFD.INI and enter **Type=CDU**, instead of `Type=B737400.TXT`. This will load the aircraft type file that is provided by the CDU. The file will be retrieved from the NetDir Folder. For more information about that, please check the Glass Cockpit instructions.

The Aircraft Configuration Files go into a Folder ("Types") within the main CDU folder, you should find several .TXT files there. If you want to create your own TXT file, just copy one of the existing ones and use it as a template.

The Aircraft Type used by the CDU (and subsequently by the Glass Cockpit) can be selected on startup, pressing LSK 1L, or later on by going to the INIT/REF, IDENT page.

Every time you select a new aircraft type, the data is re-loaded, put into the NetDir folder and the Glass Cockpit is instructed to load it as well. The name of the selected aircraft should show up in the Engine Page.

Aircraft Configuration File Structure and Definitions

Each aircraft type has its own set of data which can be currently set via entries in a file which is referenced in the **PFD.INI** (see above) entry **Type=FILENAME.EXT** (e.g.

Type=B737400.TXT). In the default Setup of the Glass Cockpit software you will find B737700.TXT and B747400.TXT

In this particular example are some annotations for the **B737700.TXT** file if you want to change the settings, but you will surely soon find more aircraft types made by us or others online.

These files will be transferred from the CDU/FMS to all other client PCs at a later stage, allowing you to change the type you are using "on the fly". To use the aircraft type selected in the CDU, edit your PFD.INI and set **Type=CDU**.

Did you know: Any entry in this configuration file will override any PFD.INI file entry. So for instance if you would Add **Efis=On** in your 737 aircraft's TXT file, you would switch the PFD/ND to the EFIS or Southwest option. This way you can have two files, one B737EFIS and another B737PFDND. Make sure the PFDND file has **Efis=Off** inside of it.

AircraftType=737-700

This is simply the name of the aircraft. This value can be empty if you don't want it to appear on the Engine page. This is also a reference for various default settings.

TOGAPitch=15
TOGAPitchInit=10

The TOGAPitch entry defines the fixed pitch the Flight Director goes to when the throttles are in TOGA mode (either via the MCP/Autopilot or the default FS98 TOGA mode). TogaPitchInit is the value used during the takeoff run itself.

N1ref = 93

When you are not using the CDU and the MCP/Autopilot, the reference N1 value is fixed and is more of an optical thing than a real feature. The N1 limit can be set via the CDU and is then sent to the MCP/Autopilot program limiting the throttles according to the particular phase of flight as set in the CDU or in the MCP.INI file.

Flare = 20

AGL in feet where you want the flare to be initiated for this particular aircraft

RadioAlt = 18

When you have a non-zero indication for the radio altimeter in the PFD and enter this value for the radio altimeter on the ground, it will display 00.

TRAlt=1200
AccAlt=1500

Thrust Reduction and Acceleration Altitude in feet

MaxAlt=39000
Ceiling=39000
MaxCrzAlt=39000

Either entry can be used, defines the maximum useable altitude

Weights=Kgs/Lbs/Kg
Lbs=On

Kgs=Off

Sets *displayed* weights to Kgs or Lbs. The weights used in the tables and other definitions are always in Lbs.

EGT=On

Indicates whether you want EGT to be displayed in the Engine page of this aircraft (vertical instruments only)

EPR=On

Indicates whether you want EPR displayed instead of N1 (where applicable depending on aircraft type)

EGTMax=950**EGTLim=890****EGTRef=600**

EGT Red (Max and Startup Ref) and Amber (Lim) line values.

EGTFactor=1.05

EGT Factor, if wanted, in this case it will increase the FS EGT values by 5%

NetWeight=88000**Payload = 20000****Fuelmax = 40000**

These weights are in pounds, where the payload is a fixed value which should be taken into account within the AIR file of the type flown (please check the flight model's documentation) as well as the weight. The setting Fuelmax is only used when FS is not connected.

Engines=CFM56-7B20

The name of the engine type used.

EnginesRate=20K

The rating of the engines... which is used on some pages of the CDU.

RefBankClean=15**RefBankFlaps=12**

Reference bank angle clean and with extended flaps.

FFFactor=1.1

You can change the actual fuel flow display by entering a factor for each type of aircraft. The fuel flow displayed in this case will be 10% higher than the one calculated by FS.

FFMax=15

The maximum expected fuel flow in 1000s of pounds (per engine).

OilPressMin=**OilPressMax=****OilTempMax=**

Min and Max Oil Pressures and Temperatures

Startup Delay Definitions

N2StartupDelay=20
N2Crank=32.3
N2ContinueDelay=10
N2Stable=55.2
N2ShutDownDelay=20

N1Init=3.3
N1StartupDelay=20
N1Stable=23.7

EGTStartupDelay=20
EGTStable=494
EGTShutDownDelay=20

You can define all phases of the engine start.

N2

When the starter switch is activated, N2 spools up within [N2StartupDelay] seconds to the value [N2Crank]%. When you add fuel it goes to the value [N2Stable] within [N2ContinueDelay] seconds.

N1

When the starter switch is activated, N1 spools up to [N1Init]%.
When you add fuel it goes to the value [N1Stable] within [N1StartupDelay] seconds.

EGT

When the starter switch is activated, EGT remains at OAT.
When you add fuel it goes to the value [EGTStable] within [EGTStartupDelay] seconds.

The values above *have* to be set for the Startup Delay sequence... N1Init is the N1 value at which the Startup delaying sequence is started, i.e. when on startup N1 passes 3.2 it will switch into the startup sequence. N1 Stable and N2 Stable are the target values after completion of the spooling up and both values are stabilized. This will get rid of the discontinuity of the values, as both N1 and N2 "jump" quite a lot in FS.

Please note, the N2Crank, N2Stable, N1Stable and EGTStable values depend on your flight model. They will not override the actual values generated by the flight model, they will just slow down the process to more realistic values.

MaxMach=0.82
mmo=0.82

The cruise mach limit for barber pole.

MinIAS=30

Minimum IAS shown in Speed Tape on the ground

vle=260

Maximum Speed for Landing Gear Extraction

Trim Indications

```
TrimMin=2.1
TrimMax=8.6
TrimScaleMax=11.5
TrimScaleMin=0
```

In FS, Trim is defined as a value from -16383 to +16383. These values can be translated to a scale depending on the aircraft. In this case, the Scale would be translated to 11.5 for the value of +16383 and 0 for the value 16363. The TrimMin and TrimMax entries are for the "green band".

Flap Positions

The next blocks of entries (in this particular case) represent the nine **flap positions** of the default FS98 B737-400. These are 0 (translated to UP), 1, 3, 5, 15, 20, 25, 30, 40 in this particular case. The values are to be understood as follows

- **flppos** (FS98 flap setting, scaled from 0 to 40, where 0 is flaps up, 40 is full flaps. Note: in this example, the real flap setting of 25 is equal to flppos=20, but only because it is
- **flpset** (Real flap setting, i.e. what the current flap setting's denomination is next to the flap lever in the cockpit)
- **vmax** (Maximum speed for the particular flap position, in this case, for flaps up 340 IAS. This is where the upper part of the barber pole in the PFD speed tape will end. It will be translated to mach at high altitudes)... you can also use values such as vref40+70 (meaning the Vref for flaps 40 plus 70 knots).
- **vret** (Flap retraction speed for the flap bugs in the speed tape. At this speed, the flaps must be retracted to the next higher setting, not possible when flaps are up, thus 0 for flpset=0, but set to 190 IAS for flpset=1, i.e. flaps should be retracted when passing this bug)
- **vext** (Speed at which the flaps have to be set to the next lower setting. For flpset=0 it is 210 IAS, thus we have to extract flaps 1 when we are about to pass the bug)
- **vmin** (Minimum manoeuvring speed for the particular flap setting)

```
flppos=0
flpset=0
vmax=340
vret=0
vext=210
vmin=190
```

```
flppos=5
flpset =1
vmax = 230
vret = 190
vext = vref40+60
vmin= 170
```

```
flppos=10
flpset = 3
vmax = 227
vret = 180
vext = 180
vmin = 165
```

```
flppos=15
flpset = 5
```

```
vmax = 225  
vret = 170  
vext = 170  
vmin = 160
```

```
flppos=20  
flpset=15  
vmax = 195  
vret = 160  
vext = 150  
vmin = 140
```

```
flppos=25  
flpset=20  
vmax=190  
vret=150  
vext=140  
vmin=135
```

```
flppos=30  
flpset=25  
vmax=190  
vret=150  
vext=140  
vmin=130
```

```
flppos=35  
flpset=30  
vmax=185  
vret=140  
vext=125  
vmin=120
```

```
flppos=40  
flpset=40  
vmax=158  
vret=120  
vext=0  
vmin=120
```

The following two entries add the respective speed (in the first case 10 knots) to the speeds for the flap settings above, when the gross weight of the aircraft passed the value specified in flpadd1. I.e. the vmin of 120 IAS for flpset=40 is increased to 130 when the gross weight is above 116700 lbs.

```
flpadd1=116700  
flpkts1=+10
```

```
flpadd2=138200  
flpkts2=+20
```

The table for the V1, V2 and VR speeds that follows is interpreted for a take-off at flaps 10 (vr=10). If no other flap values are specified, then they are applied to the present flap setting. Each line starts with a weight in pounds, the V1 speed, VR and finally V2. You can have as many entries as you wish, the values are calculated linearly from one weight to the next. The table must be concluded with the line "vrend". The values have to go from the smallest weight to the

highest.

```
;v1,vr,v2 for flaps 10  
vr=10  
88200 113 114 130  
93700 117 119 133  
99200 121 123 136  
104700 125 127 139  
110200 129 131 142  
115800 133 135 146  
121300 137 139 149  
126800 141 144 152  
132300 144 148 155  
137800 148 152 158  
143300 151 155 161  
148800 155 159 165  
154300 158 163 168  
vrend
```

The table for the Vref is similar to the table above. In this case the flap setting is 40 (vref=40). If no other flap values are specified, then they are applied to the present flap setting. Each line starts with a weight in pounds, followed by the Vref. You can have as many entries as you wish, the values are calculated linearly from one weight to the next. The table must be concluded with the line "vrefend".

```
;vref for flaps 40  
vref=40  
77200 109  
82700 113  
88200 116  
93700 120  
99200 124  
104700 127  
110200 130  
115800 134  
121300 137  
126800 140  
132300 143  
137800 146  
143300 149  
148800 152  
154300 155  
vrefend
```

The stick shaker speeds can be set as well... using the same system as the other speeds.

```
;stick shaker speeds for flaps up  
vss=0  
90000 137  
100000 144  
110000 152  
120000 157  
130000 165  
132500 167  
vssend
```

```
vss=1
vss30 1.12
vssend
```

N1 Tables

```
n1tablefactor=1.1
```

N1 multiplier, in this case it would increase all N1 values in the table by 10%

The following is a table for the takeoff thrust N1% limit. The table goes from the highest to the lowest temperature in the first column, then the various N1 settings are listed in columns according to the airport's pressure altitude (OAT).

```
n1totable
C -2000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000
60 84.0 84.7 86.1 87.3 88.1 89.1 89.3 89.5 88.8 88.2 87.9
55 84.8 85.8 87.0 88.1 89.0 90.0 90.1 90.3 89.6 88.8 88.1
50 85.8 86.8 87.9 88.9 89.8 90.8 90.9 91.0 90.3 89.6 88.7
45 86.8 87.7 88.8 89.7 90.7 91.7 91.7 91.7 91.1 90.4 89.5
40 87.7 88.6 89.7 90.6 91.6 92.5 92.4 92.4 91.8 91.2 90.3
35 88.4 89.5 90.6 91.5 92.4 93.4 93.3 93.2 92.6 91.9 91.0
30 88.2 90.1 91.1 92.1 93.0 94.0 94.0 94.0 93.4 92.7 91.8
25 87.5 89.7 90.7 91.8 92.7 93.7 94.2 94.3 94.1 93.5 92.6
20 86.8 89.0 90.0 91.1 91.9 93.0 93.4 93.9 94.5 94.2 93.4
15 86.0 88.3 89.3 90.3 91.2 92.2 92.6 93.1 93.7 94.2 94.0
10 85.3 87.5 88.5 89.6 90.4 91.4 91.9 92.3 92.9 93.4 93.7
5 84.6 86.8 87.7 88.8 89.6 90.7 91.1 91.6 92.1 92.6 92.9
0 83.8 86.0 87.0 88.0 88.9 89.9 90.3 90.8 91.3 91.8 92.1
-5 83.1 85.2 86.2 87.2 88.1 89.1 89.5 90.0 90.5 91.0 91.3
-10 82.3 84.5 85.4 86.4 87.3 88.3 88.7 89.2 89.7 90.2 90.5
-15 81.6 83.7 84.6 85.6 86.5 87.5 87.9 88.3 88.9 89.3 89.7
-20 80.8 82.9 83.8 84.8 85.7 86.7 87.0 87.5 88.1 88.5 88.8
-25 80.0 82.1 83.0 84.0 84.8 85.8 86.2 86.7 87.2 87.7 88.0
-30 79.2 81.3 82.2 83.2 84.0 85.0 85.4 85.8 86.4 86.8 87.2
-35 78.4 80.5 81.4 82.4 83.2 84.1 84.5 85.0 85.6 86.0 86.3
-40 77.6 79.6 80.5 81.5 82.3 83.3 83.7 84.1 84.7 85.1 85.4
-45 76.8 78.8 79.7 80.7 81.5 82.4 82.8 83.3 83.8 84.2 84.5
-50 76.0 78.0 78.9 79.8 80.6 81.5 81.9 82.4 82.9 83.3 83.7
-55 75.2 77.1 78.0 79.0 79.8 80.7 81.1 81.5 82.1 82.5 82.8
end
```

There are two ways of defining the climb N1% limit, one is a simplified list, the other a table just like the takeoff thrust limit table.

Solution 1)... listing altitude and a corresponding N1 value:

```
n1climb
0 86
5000 87.3
10000 88.6
15000 89.5
20000 93.8
25000 97.6
30000 98.2
```



```

35000 98.9
37000 99.1
41000 98.8
n1end

```

Solution 2)... using a table just like the one for the takeoff N1:

```

n1clbtable
C 0 5000 10000 15000 20000 25000 30000 35000 37000 41000
60 83.7 83.8 83.7 83.7 86.9 91.3 92.9 94.3 94.4 92.7
55 84.7 84.6 84.6 87.3 90.6 92.3 93.6 93.7 92.0 84.5
50 85.2 85.5 85.5 85.5 88.2 90.7 91.6 92.9 93.0 91.3
45 86.0 86.3 86.3 86.3 89.1 91.6 91.6 92.2 92.3 90.6
40 86.9 87.0 87.1 87.1 89.9 92.4 92.4 91.5 91.6 89.9
35 87.8 87.9 87.9 90.7 93.2 93.2 92.3 91.6 90.0 87.5
30 86.8 88.5 88.6 88.7 91.5 94.0 93.9 93.1 92.5 91.0
25 86.1 88.6 89.4 89.4 92.3 94.8 94.6 93.9 93.3 92.0
20 85.4 87.9 90.2 90.1 93.0 95.5 95.3 94.6 94.1 92.9
15 84.7 87.1 89.6 90.9 93.8 96.2 96.0 95.4 94.9 93.9
10 84.0 86.4 88.8 91.1 94.6 96.9 96.6 96.1 95.7 94.8
5 83.2 85.7 88.1 90.3 95.5 97.8 97.3 96.9 96.5 95.7
0 82.5 84.9 87.3 89.5 94.8 98.9 98.3 97.8 97.4 96.6
-5 81.8 84.1 86.5 88.7 94.0 98.8 99.3 98.5 98.2 97.7
-10 81.0 83.4 85.7 87.9 93.2 98.0 99.6 99.4 99.1 98.6
-15 80.3 82.6 85.0 87.1 92.4 97.3 98.8 100.4 100.1 99.6
-20 79.5 81.8 84.2 86.3 91.5 96.5 98.0 100.1 100.6 100.2
-25 78.7 81.0 83.3 85.5 90.7 95.7 97.2 99.2 99.8 99.4
-30 78.0 80.2 82.5 84.7 89.9 94.9 96.4 98.4 98.9 98.6
-35 77.2 79.4 81.7 83.8 89.0 94.0 95.5 97.6 98.1 97.7
-40 76.4 78.6 80.9 83.0 88.2 93.2 94.7 96.7 97.2 96.9
end

```

Climb 1 and 2 thrust reduction sequence E.g.: reducing by 3% N1 until 10000 ft, gradually increasing to full climb N1 until 15000 ft:

```

clb1-reduction
3, 10000, 15000

```

```

clb2-reduction
6, 5000, 15000

```

Flight Mode Annunciators

Most Aircraft types follow the same "rules" as far as the FMA (Flight Mode Annunciators) are concerned, but the texts can differ greatly. This is more true for Boeing Aircraft than Airbus. These Texts can be changed in every single TXT file, and you only have to enter the ones you want to change. The following is a listing of the DEFAULT settings:

Speed Modes:

```

ASPD1=ARM
ASPD2=THR
ASPD3=SPD
ASPD4=RETARD
ASPD5=THR HL
ASPD6=FMC SPD

```

ASPD7=MCP SPD
ASPD8=IDLE

Heading Modes:

AHDG1=HDG SEL
AHDG2=VOR/LOC
AHDG3=VOR/LOC
AHDG4=APP LOC
AHDG5=LOC ARM
AHDG8=LNAV
AHDG9=ROLLOUT
AHDG10=HDG HOLD

Altitude Modes:

AALT1=GS LOCK
AALT2=ALT
AALT3=MCP SPD
AALT4=V/S
AALT5=ALT ACQ
AALT6=GS ARM
AALT7=TO/GA
AALT8=TO/GA
AALT9=VNAV SPD
AALT10=VNAV PTH
AALT11=VNAV ALT
AALT12=FLARE

Command (A/P) Modes:

ACMD1=CMD
ACMD2=F/D
ACMD3=LAND 2
ACMD4=LAND 3
ACMD5=NO AUTOLAND

Standby Modes:

SSPD1=ARM

SHDG1=LNAV
SHDG2=VOR/LOC
SHDG3=VOR/LOC
SHDG4=ROLLOUT

SALT1=VNAV
SALT2=GS
SALT3=FLARE
SALT4=V/S

Thus, if you wanted to change the annunciator of the Autopilot main mode to A/P from CMD, you would have to enter:

ACMD1=A/P

To define:

n1max=

n1lim=

n1ref=

n1ga=

n1mct=

n1garef=

n2ref=

engineoutfactor=2

factor to correct the slip indication during an engine out

stallpitchfactor=2

Artificial Stall Induction for Boeing Pitch Component

Stallbankfactor=2

Artificial Stall Induction for Boeing Pitch Component