

Reality XP Flight Line N

User's Manual



This manual is intended for Flight Simulation use only, and may not be used in any real world aviation applications. The authors are not responsible for any errors or omissions. This manual may be printed out by the user or at the user's request by a commercial print shop. This authorization is provided by the publisher of this product.

About this manual

This manual is intended for flight simulation purposes only, and shall not be used for any real world aviation application or reference.

This manual is intentionally written using “gray scale” colored text in many areas, and much of the print is intentionally this medium gray color. This has been done to conserve ink while printing. In some cases “black” type has been used for emphasis. Photographs used in this manual have also been reduced to black and white, and also in contrast in order to conserve ink. Please be sure to double-check your printer’s settings prior to printing in order to achieve the best results. We have tested, and experienced no issues printing this manual on laser printers. If you are experiencing a problem using a laser printer, you should check the printer’s quality settings.

By reading this manual you should become well acquainted with the product, and should be able to obtain the information necessary to “fly” the product within Flight Simulator.

Please take the time to read this manual completely; so that you can become properly acquainted with the product and its operation.

We thank you for having chosen a Reality XP Product and wish you a pleasant and a safe virtual flight with us.

Important information

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www.reality-xp.com

Standard Disclaimer

This software is designed **for entertainment only**. Although we have designed the product to resemble and function like the original, it is not designed as a training device. Not all systems have been simulated, and some of those that have been simulated may not be entirely functional.

NOT FOR USE IN REAL FLIGHT OR AIRCRAFT OPERATION.

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Flight Line N overview

You think smooth 3D gauges in virtual cockpit set the bar? Think again!

For the discriminating pilots, the Flight Line N is a comprehensive solution brought to you by Reality XP. It is a complete set of mechanical gauges based on a state of the art technology.

TrueGauge XP is the leading technology from Reality XP exclusively engineered for simulation of mechanical gauges. With our proven track record of offering the highest standards in simulation Reality XP sets the bar again with mechanical gauges simulation.

TrueGauge XP is a technology offering a higher level of accuracy, smoothness and precision of the 3D modeled gauge approach, while allowing the gauge to be rendered in the Virtual Cockpit, the 2D panel, a popup window or a second monitor!

Because gauge simulation is not just displaying bitmaps that look like a gauge, but because it is also about operational procedures and mechanical constraints, TrueGauge XP achieves the highest simulation fidelity available on the Desktop PC, unsurpassed by any other desktop simulators.

Reality XP's unique expertise brings a new dimension to traditional gauges in offering the smoothest gauges on the market today, as well as the most realistic simulation of the internal mechanical bearings and parts making a mechanical gauge.

TrueGauge XP also sets new standards visually with carefully crafted highlights, shadows and details. With this new technology, the gauge elements are smoothly blended for the best graphics. It is virtually like having an animated multi layered Photoshop photo in real time!

Engineered with the leading edge development best practices in graphics animation, TrueGauge XP renders faster, better and more precisely than any other SDK based gauge for the best simulation experience.

For the first time, you will be able to fly an approach with your instruments to the same level of accuracy and precision you would find with real gauges!

The Reality XP Avionics products are unequalled in providing the features, levels of performance and reliability that flight simulation users require. The Reality XP Avionics sets a new higher standard to which all other Avionics Simulations will be compared.

Product Features

The Flight Line N includes a set of 24 gauges used for navigation and IFR flights, as found in any “non-glass” aircraft with the following features:

- VOR1 (6 types)
- VOR2 (6 types)
- ADF (2 types)
- RMI (2 types)
- STEC 55X Autopilot
- STEC ST360 Altitude Selector Alerter
- STEC ST645 Remote Annunciator
- STEC FD/AP Switch
- Standby Altimeters (4 types).
- Dimmer knob.
- Support for any third-party aircraft lighting system both in the 2D panel and the virtual cockpit, as well as adjustable lighting and integral lighting.
- Highly accurate needle position and precision on the gauge scales.
- High resolution Photo-realistic gauges bitmaps.

The gauges features are simulated in form, fit and function. The Flight Line N gauges have been designed as accurately as is possible based on their real-world counterpart.

Documentation

After installation, a new program group is accessible from your Windows Start Menu \ Reality XP. This program group contains the necessary utilities and documentation. Make sure you review all available documentation.

Please take the time to read all manuals completely so that you can become properly acquainted with the product and its operation.

In addition to the Reality XP documentation, we suggest you download the STEC Pilot Operating Handbook for the STEC 55X Autopilot System:

<http://www.s-tec.com/publications.html>

Flight Line N gauges presentation

VOR1 and VOR2



The VOR set includes six different types with advanced features. The OBS knob can be configured to work like a real knob, with a slight latency when selecting a radial. When pushed (middle mouse button), the VOR either centers the CDI on the TO radial when tuned to a VOR station, or aligns the card to the current heading when tuned to a LOC station. In addition, the VOR needles move with an unmatched accuracy and fluidity with our latest generation of True Display XP.

ADF



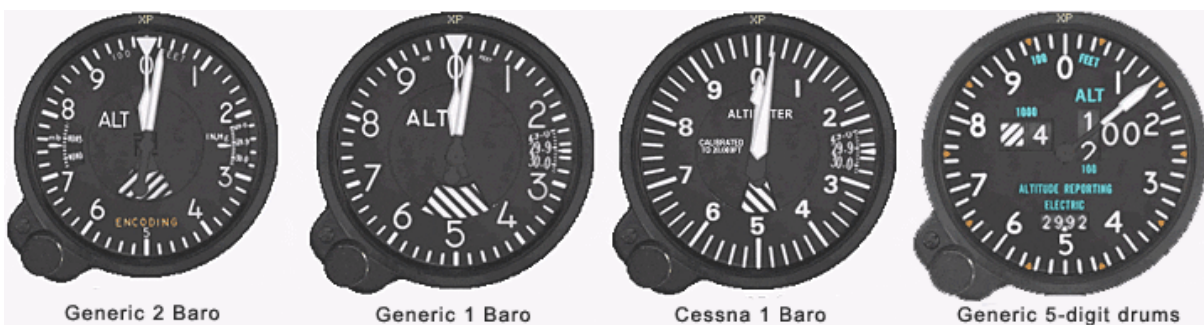
The ADF set includes two different types with an accurate simulation of the ADF signal and gauge internal decoding systems. In addition to ADF dip, the needle is affected by static discharges, moist and thunderstorms (cumulonimbus). The card can be configured to be synchronized to the HSI heading, in addition to the manual HDG knob. Like with the VOR gauges, the knob can be configured to work like a real knob, or like an “ideal” knob (like with any other FS gauges).

RMI



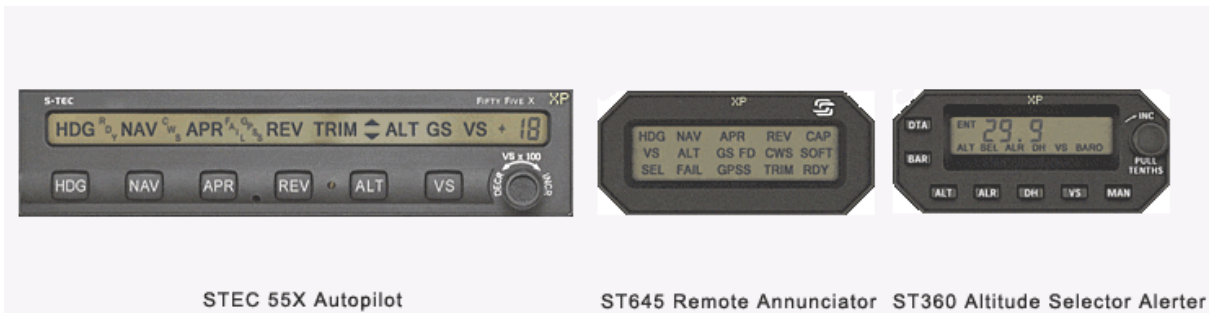
The RMI set includes two different types. The KI 229 NAV needle can be configured to NAV1 or NAV2. It can further be toggled between the two channels in the panel with the hidden click spot located to the bottom left corner of the gauge. The KNI 582 supports right mouse button on the source selection buttons in order to change the single and double needle source channels. In addition to ADF dip, the ADF needle is affected by static discharges, moist and thunderstorms (cumulonimbus).

Standby Altitude



The Standby Altitude set includes four different types with user configurable barometric unit (for the single barometric window type of altimeter gauge). In addition, markings every 50 feet can be configured on the gauge dial. Pressing the middle mouse button over the knob automatically adjusts the barometric setting to standard. The Baro setting is independent from the default (main) altimeter setting.

STEC Autopilot System



The STEC Autopilot system includes four gauges: the ST 55X, the ST 645, the ST 360 and an FD/AP switch (not shown).

The ST 55X works without the other gauges in a limited mode: the only ALT mode available is ALT HOLD. When used with the ST 360, an hidden click spot located between the ALT and the VS button (this simulates pressing both button at the same time) activates the Flight Level Change mode. NB: it is recommended to configure the panel with the FD/AP switch for best experience.

Gauge Mounting options



In addition to configuring the type of each gauge in the panel, three mounting options are available for most of the gauges.

Operation with Flight Simulator

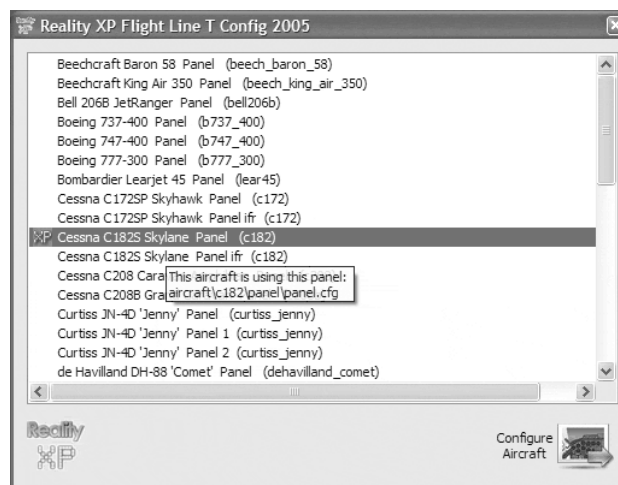
This section covers detailed information about how to access the enhanced features the gauge offers when running with Flight Simulator.

Getting Started

During installation, the Flight Simulator default Mooney will be configured ready-to-fly with Flight Line N (an additional panel configuration file, PANEL.FLT.FLN.CFG is also copied in the Mooney panel folder if you have both FLT and FLN products). A tutorial is included in this manual to help you understand the basics of panel configuration and to permit adding Flight Line N gauges in any of your aircraft.

The Flight Line N is a Flight Simulator compatible gauge pack and can be configured in any Flight Simulator aircraft panel. In addition to configuring the gauges in the panel, many settings are available to tailor the integration to your specific needs. The software package includes an easy to use configuration program to assist with configuration: FLN Config.

When first started, FLN Config detects and prompts you with all available aircraft and panels with the “select an aircraft” panel. Flight Simulator has an open architecture that permits several aircraft to share the same panel, and the selected aircraft can use different panel configurations. Not all available aircraft and panels configurations are listed in the “select an aircraft”: FLN Config lists only the unique combinations of both aircraft and panels.



Refer to the additional FLN Service Manual (located in your Windows Start Menu \ Reality XP program group), for additional panel configuration options and information.

Configuration File

FLN Config provides a graphical user interface to most of the settings provided for the FLN. For each customized aircraft and/or panel, a copy of the configuration files (.INI) will be added to your aircraft\Panel folder.

The FLN gauges look for an ini file, first in the panel folder, then in the aircraft folder and lastly use the settings from the Reality XP Common Settings folder.

Refer to the additional FLN Service Manual (located in your Windows Start Menu \ Reality XP program group), Section RXPFLN.ini for additional details and options.

General Features

All of the Reality XP gauges and controls utilize a relatively unique implementation of click spots. They work as follows:

1. As your mouse cursor passes over a click spot on the panel it will cause it to turn from an arrow cursor into a “hand” cursor. There are no + or – click spots: the hand cursor will be empty.
2. Whenever a single click spot is used, and depending upon its function a left click will accomplish the same task as a right click. In other cases, a left click will accomplish one task, while a right click will accomplish another.
3. In some cases the click spot will not function as stated above, but instead will feature separate functions for the left and right clicks. Example: For a toggle switch with 3 positions, a left click will move the switch in one direction, while a right click will move it in the opposite direction.
4. Certain click spots will work with left and right clicks, and the mouse wheel, if your mouse is so equipped. This type of click spot is used on gauges that require adjustment, such as the knobs, etc. In this case the left click turns the item “left” and a right click turns it “right”. Forward / back scrolling on your mouse wheel will also do the same.

Tool Tips

By turning on FS “Tool Tips” you will see descriptions of these clicks spots when your mouse cursor is placed over them.

Special Click spots



Illustration of the Bendix King KI 229 RMI

1 – Popup / Readout / Cover: Located in the center of all the gauges, the click spot supports multiple functions. The left mouse button operates a popup ident configured in the RXPFLN.INI file and toggles a popup window. On some gauges, the middle mouse button toggles a digital readout of the gauge values. The right mouse button toggles a cover to hide the gauge. This permits hiding failed gauges and/or practice gauge failures.

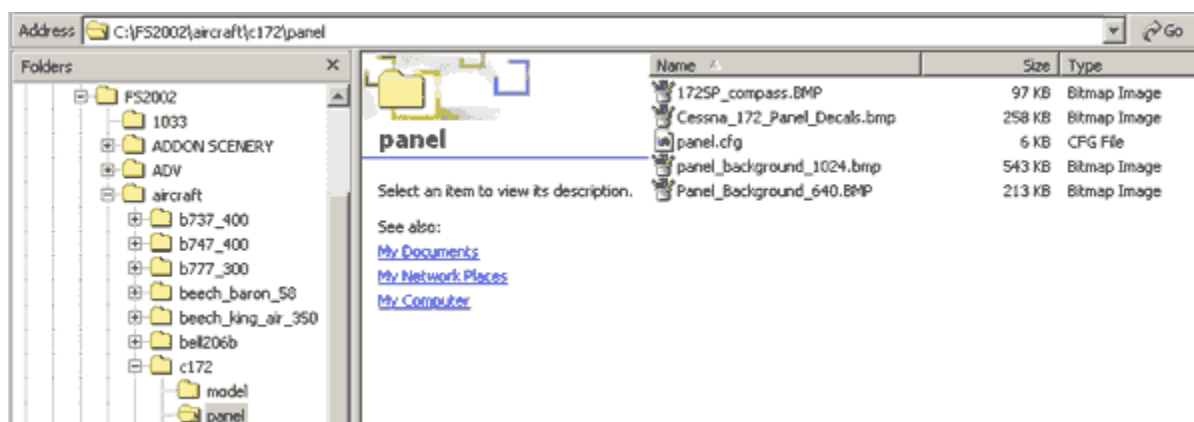
2- NAV Channel Source: The click spot available with the KI 229 toggles the NAV Channel source for the single needle between NAV1 and NAV2.

Flight Line N Panel Configuration

Introduction

The Flight Simulator panel system is designed to allow many different configurations for placing the gauges when designing a panel. The panel of your aircraft could be as simple as a single bitmap layout with the standard T layout for the altimeter, the attitude display or as complex as a multi-window panel with pop-ups radio stacks and GPS. The panel.cfg file holds all the information needed to define what an aircraft panel looks like. The panel.cfg file is a simple text file that can be loaded and edited with the windows notepad.exe.

Each aircraft in Flight Simulator has its own panel.cfg file located in the aircraft folder:



The following sections will guide you through a step-by-step tutorial to configure the default C72 panel with Flight Line N. More information about panel configuration is available in your Flight Line N Service Manual accessible from your Windows Start Menu \ Reality XP program group.

NB: the Flight Line N installation configures automatically your Mooney normal panel with Flight Line N. Customer with both FLT and FLN will find a PANEL.FLT.FLN.CFG in the Mooney panel folder. Rename to and replace the PANEL.CFG file in order to use it.

Panel Configuration for the C172

Before proceeding with the tutorial, we suggest you make a backup copy of your panel configuration file. The file name and location is:

```
FSX\SimObjects\Airplanes\C172\panel\panel.cfg
```

Now that you have made a backup copy, you can open the panel.cfg file with notepad.exe.

First look at the panel.cfg file

We will start with the main panel and replace some of the gauges with Flight Line N gauges. The main panel for the C172 is identified and configured in the following Window section:

```
[Window00]
file_1024=cessna_172_background.bmp
file_1024_night=cessna_172_background_night.bmp
size_mm=640
position=7
visible=1
no_luminous=1
ident=MAIN_PANEL
```

Following the Window information header, the gauges are listed sequentially:

```
gauge00=Cessna!Altimeter, 346, 167, 79, 79
gauge01=Cessna!Annunciator, 517, 159, 62, 15
gauge02=Cessna!Avionics Switch, 288, 426, 37, 47
...
```

A flight simulator gauge file includes one or more gauges. Each gauge in the panel.cfg file is attached to a window with a line beginning with gauge##=, using sequential numbering. To define a gauge in a particular window, the line generally includes the following information:

```
gauge##=gauge_file_name!gauge_name,position_horizontal,position_vertical,gauge_size_horizontal,gauge_size_vertical
```

In some panels, there are some gauges without the gauge_size_horizontal and gauge_size_height parameters. This means that the original gauge size is exactly designed for this panel. In this case, when using gauges in high resolution like the Flight Line T, we can adjust the gauge width and height on the panel to match the main panel background bitmap. This will be done with trial and error in configuring the gauge and then loading the aircraft in Flight Simulator. This cycle is repeated until finding the right sizes.

Replacing gauges in the main panel

We will now replace the default gauges with Flight Line N gauge. The first one in the panel.cfg file is the VOR1. Let's change the following:

```
Gauge29=CessnaWAlpha!VOR1_Alpha, 431, 167, 79, 79
```

with this:

```
gauge29=rxpFLN!VOR1, 431, 167, 79, 79
```

Save the file and start Flight Simulator, select the Cessna 172 to see the change. NB: you can keep the notepad.exe opened for now.

You will notice the default VOR1 replaced with the Reality XP Flight Line N VOR1. However, this is not a Bendix King indicator. We will configure this later. Keep Flight Simulator running and select another aircraft. We will continue configuring the panel with the rest of the gauges. In the panel.cfg file, locate the following entries:

```
Gauge26=CessnaWAlpha!ADF_Alpha, 431, 329, 79, 79  
Gauge28=CessnaWAlpha!VOR2_Alpha, 431, 247, 79, 79
```

and change them with this:

```
Gauge26=rxpFLN!RMI, 431, 329, 79, 79  
Gauge28=rxpFLN!VOR2, 431, 247, 79, 79
```

NB: the gauges are configured with the same size as the original panel. However, you can change the width and height in order to keep each relative gauge size proportional to their design dimensions. More information about the original gauge resolution is available in the FLN Service Manual.

Replacing gauges in the Virtual Cockpit

The virtual cockpit gauges are configured in a similar way as the 2D panel. First, locate this window section near the end of the file:

```
[VCockpit01]  
size_mm=512,512  
pixel_size=512,512  
texture=$C172s_1  
background_color=0,0,0
```

Following the method for the 2D panel, we can now change the relevant entries with Flight Line N gauges. First, we will raise the virtual cockpit resolution in changing the following line:

```
pixel_size=1024,1024
```

Then we replace the default gauges with Flight Line N gauges:

```
gauge01=rxpFLN!VOR1, 259, 1, 140, 140  
gauge03=rxpFLN!RMI, 259, 283, 145, 145  
gauge11=rxpFLN!VOR2, 259, 142, 140, 140
```



Gauge smoothness in the virtual cockpit is directly affected by the number of [VCockpit##] sections in the panel.cfg file.

A panel with a single section offers the best refresh rate and smoothness, similar to the 2D panel. Each additional virtual cockpit section cuts the refresh rate from a "maximum" rough rate equivalent to $\frac{1}{2}$ of the FS FPS counter (max_rate). The general rule of thumb is:

1 section = max_rate frames per seconds per section.
2 sections = max_rate/2 frames per seconds per section.
3 sections = max_rate/3 frames per seconds per section.
etc...

NB: FLN runs with maximum fluidity and refresh rate, and each gauge draw rate can be independently limited in the INI file. However, the virtual cockpit refresh rate is a flight simulator limitation imposed to the gauges and we suggest you choose aircraft carefully designed by their third party vendors for the maximum performance and fluidity!

You can now save the panel.cfg file and exit notepad.exe. Before loading the aircraft again in Flight Simulator, we need to adjust the Flight Line N gauge types and settings!

FLN Config

FLN Config is an application designed to help you configure your gauge settings with a convenient user interface. Start FLN Config from your Windows Start menu \ Reality XP program group, and then double-click the “Cessna C172 Skyhawk Panel (c172)” line to open the settings pane.

Change the following options. When done, press the OK button, close the FLN Config application and load the C172 in Flight Simulator to see the changes!

VOR1 and VOR2 Gauges

Type: Bendix King KI 209A
Mounting: Screws
OBS Simulation: Real
OBS Connection: Enabled
GPS Connection: Enabled

(leave the other options to their default and the popup value empty)

RMI Gauge

Type: Bendix King KI 229
Mounting: Screws
RMI ADF Simulation: Real
RMI ADF Needle: Do Not Park
RMI VOR Channel: NAV1

(leave the popup value empty)

Congratulations! Your C172 panel is now configured with Flight Line N!



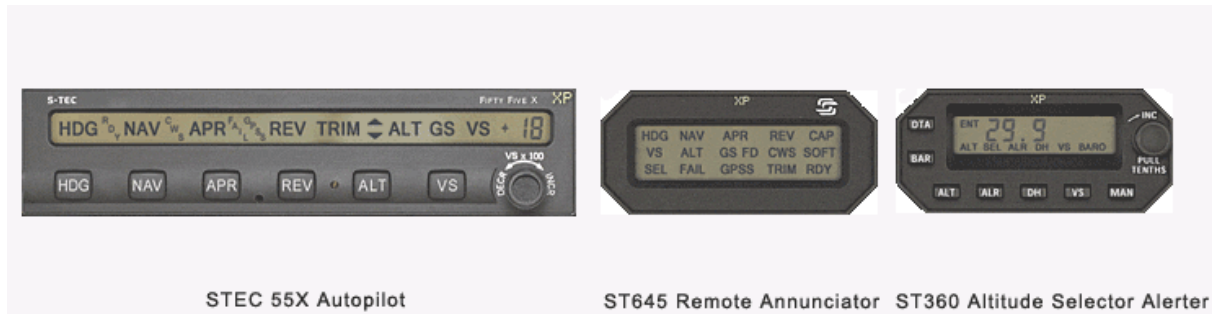
Going further

Most aircraft panels can be configured using the method outlined above. In addition, the Flight Line N gauge supports individual popup window controls, and night lighting options. For the most demanding configurations, we suggest you use graphical user interface driven panel configuration tools to assist in gauge size and position.

STEC Autopilot

Introduction

The STEC System 55X autopilot system is a comprehensive, three unit based system. It features a Panel Mounted Mode Selector, a remote Panel Mounted Altitude Selector Alerter and a remote Panel Mounted Mode Annunciator



Two click spots are provided on the 55X to simulate simultaneous key presses involved for some operating mode:

Between the HDG and NAV keys: to ARM the HDG/NAV intercept mode. (This mode is only available when the NAV/GPS switch is in NAV mode).

Between the ALT and VS keys: to ARM the Flight Level Change mode. This mode is enabled only when the ST360 is configured in the panel.

In addition to the panel mounted units, the system is armed / engaged through the use of a switch. NB: the switch must be on the panel for the ST55X to run.



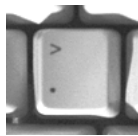
FD/AP Switch: three positions mode switch to turn OFF the system, ARM the system in FD (Flight Director Mode) only, and ARM and ENGAGE the Autopilot Servos (FD/AP).

Important Notice

The Remote Selector Alerter permits selecting a desired altitude. The altitude “flown” by the STEC System 55X Autopilot is based on its own corrected altitude and barometric selection. Make sure to set the Remote Selector Barometric setting to a relevant setting prior engaging a Flight Level Change mode.

Control Wheel Steering (CWS) & AP Disconnect

The STEC System 55X features the CWS mode and the AP Disconnect function. In a real aircraft implementation, these two functions are operated with the use of two yoke mounted buttons. In this simulation, we have implemented the two features with a convenient single button operation, through the BRAKE key. When the aircraft is in the air, the CWS/APDisco key is rerouted to the BRAKE key. When the aircraft is on the ground, the CWS/APDisco key is disabled and the BRAKE key works normally.



CWS/AP Disco Keyboard Shortcut
(English keyboard)



CWS/AP Disco Joystick / Yoke Shortcut
(Button 1)

To engage the CWS Mode:

The FD/AP switch must be in the FD/AP position. Press and hold the BRAKE Key. When the CWS annunciator is flashing, adjust your roll angle and pitch for the desired Bank and Vertical Speed. When set, release the BRAKE key to engage the CWS mode. When engaged, the CWS mode will maintain your last set Bank Angle and Vertical Speed.

To Disconnect the Autopilot (AP Disco)

With the Autopilot mode engaged / armed, press and release the BRAKE key. The Autopilot will disengage any set mode and revert to the ready state.

Configuring the Aircraft and Flight Simulator for the STEC 55X

The STEC 55X is an advanced autopilot system. For proper operation with Flight Simulator, the following settings must be configured like shown below, in the autopilot section of the aircraft.cfg file:

```
[autopilot]
use_no_default_bank=1
use_no_default_pitch=1
autopilot_available=1
flight_director_available=1
default_pitch_mode=0
default_bank_mode=0
```

Product Support

You should read this manual, and the others included with this product from cover to cover before asking for support or help with this product. We have found that over 95% of all product support questions can be answered by reading the manual.

You can visit the Reality XP General Forum for general customer service issues at:

<http://www.reality-xp.com/community/users.htm>

While anyone may read this support forum, you will need to register in order to post a question or reply with an answer. Support at this forum may be provided by any one of the following individuals:

1. Members of the Development / Publishing Team.
2. Members of the product's beta testing team.
3. Knowledgeable users of the product who know the correct answer.

If you still require help: Product support is available through our online help system. Please visit <http://www.reality-xp.com> for additional support information.

Thank you.