

Document Release Note

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Reason for Release:

This is a formal release of the User Documentation prepared during the design phase of the project for the 8881 EPC SMMC Controller Software.

There are several aims in issuing this specification: -

To disseminate information about the EPC Controller Software;

To circulate the information to ensure the accuracy, especially of information relating to the operation of the system.

Accepted on behalf of Custom Electronics:

Signed:

Date:

Pylon EPC SMMC Controller Software.

User Documentation - Issue 3.0

Custom Electronics 8881 EPC SMMC Controller Software

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Status: Released
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Revision History

Issue	Date	Released	Status	Description
1.0	23.8.99	DS	Draft	Released for client agreement
2.0	8.9.99	DS	Issued	Issued for client information
2.1	22.11.99	DS	Issued	Calibration Procedure Added
2.2	22.9.00	RB	Issued	Config values modified
3.0	30.1.02	RB	Issued	Program/Beacon Track modes added

File

The present document is stored under the following file name:

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Scope

The purpose of this document is to provide a reference for the operation, maintenance and application of the 8881 EPC Controller Software.

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Related Documents

The following document(s) are related to this:

- [1] Custom Electronics Data Sheet:8813 PylonEPC Controller

1 Preamble

The Pylon system is a general purpose, graphic display system for operator inter-action and control of industrial plant. The EPC Controller is an embedded PC hardware platform for control applications. The 8881 EPC Controller Software package runs in an PylonEPC Controller and provides facilities for remote control of steerable satellite mounts.

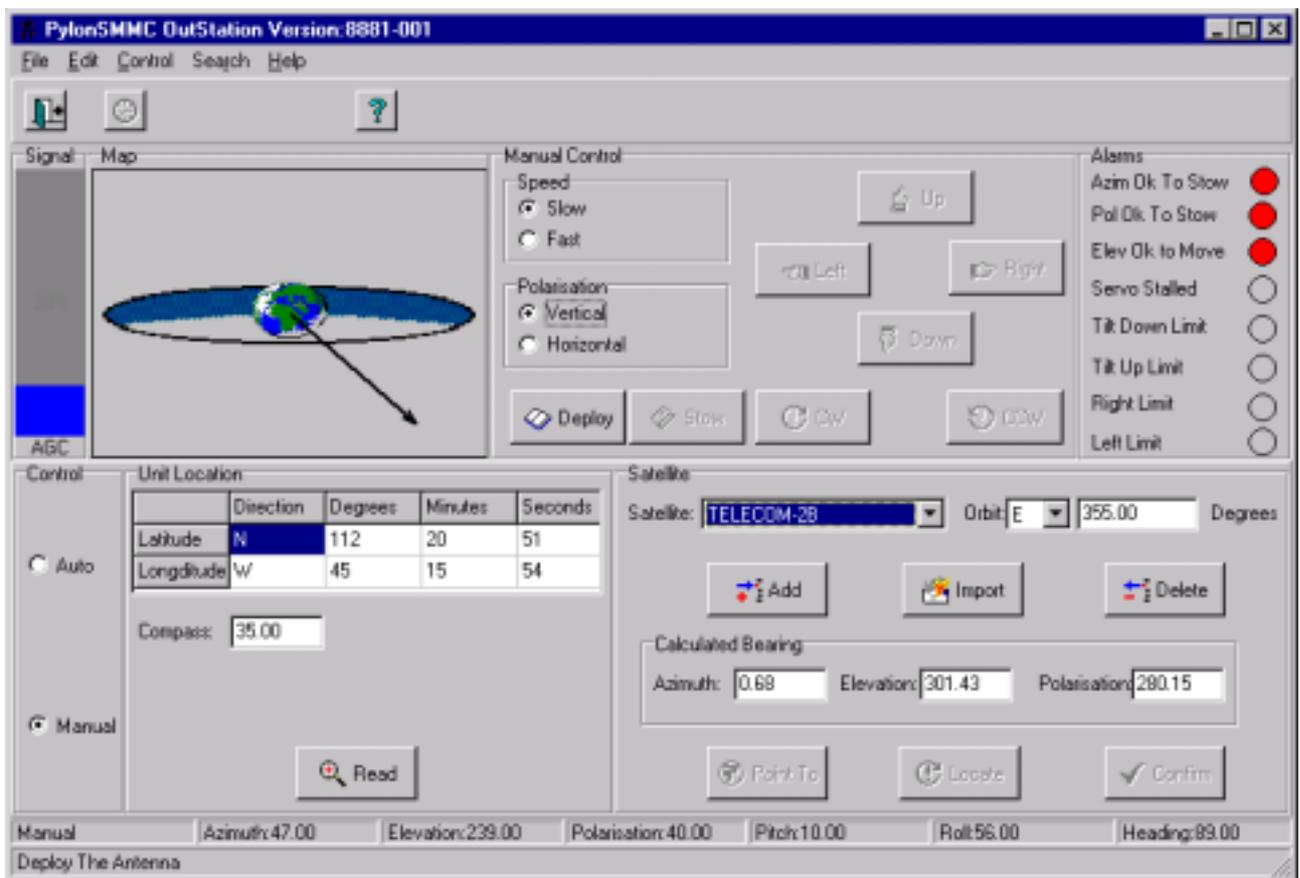
The purpose of this document is to provide a reference for the operation, maintenance and application of the 8881 PylonEPC Controller Software.

Note: Although this product can handle 1 and 2 meters dishes, only 1m dishes are considered in this document.

2 PylonEPC OutStation

There are two variants of the 8881 Pylon EPC Controller software for the DOS and Windows operating systems in an EPC outstation. As the software is functionally identical in both and just the look and feel varies, the Windows version will be used for the illustrations contained here.

Pylon EPC Controller Software is an SDI application as shown below:



The application contains a menu with the following structure:

File |

Exit

Edit |

Configuration

Unit

Program Track

Control |

Program Track

Calibrate (Disabled for 1m dishes)

Auto Locate

Search |

Track

Locate

Help |

About

There are three Speed Buttons on a toolbar that correspond to the File | Exit, Control | Calibrate, and Help | About menu options respectively.

2.1 File | Exit

This exits the Application. It is a password protected menu option.

2.2 Edit | Configuration

Allows the user to edit a configuration (Password protected) as shown below:

The screenshot shows a 'Configuration' dialog box with the following sections and controls:

- Compass:** Available. Comspec:
- GPS:** Available. Comspec:
- Inclometer:** Available. X: mV/Deg. Y: mV/Deg. Multiplier: Constant:
- Azimuth:** Multiplier: Constant:
- Polarization:** Multiplier: Constant:
- AGC:** Multiplier: Constant:
- Auto Track:** Enabled. Satellite:
- Mount Parameters:**
 - Scale:** Azimuth: Counts / Degree. Elevation: Polarization:
 - Home:** Azimuth: Degrees. Elevation: Polarization:
 - Stow:** Azimuth: Degrees. Elevation: Polarization:
- Mount:** 2m / 2.5m 1m

Buttons:

2.3 Edit | Unit

Allows the user to view the following unit information:

The 'Unit' dialog box is divided into several sections:

- Compass:** A text input field containing '35.00' followed by the label 'Degrees'. A 'Read' button with a magnifying glass icon is to the right.
- Magnetic Correction:** A dropdown menu with a '+' sign and a downward arrow, followed by three input fields labeled 'Deps', 'Mins', and 'Secs' containing the values '1', '2', and '3' respectively.
- Location:** A table with columns 'Direction', 'Degrees', 'Minutes', and 'Seconds'. The 'Latitude' row has 'N' in the 'Direction' column, '112' in 'Degrees', '20' in 'Minutes', and '51' in 'Seconds'. The 'Longitude' row has 'W' in the 'Direction' column, '45' in 'Degrees', '15' in 'Minutes', and '54' in 'Seconds'. A 'Read' button is to the right of the table.
- Database:** A 'Location:' label followed by a dropdown menu. Below it are three buttons: 'Add' (with a plus and arrows icon), 'Store' (with a floppy disk icon), and 'Delete' (with a minus and arrows icon).
- Bottom:** Two buttons: 'OK' (with a green checkmark icon) and 'Cancel' (with a red X icon).

2.4 Edit | Program Track

This menu option allows the user to set-up parameters for Program-Track or Beacon-Track.

2.5 Control | Program Track

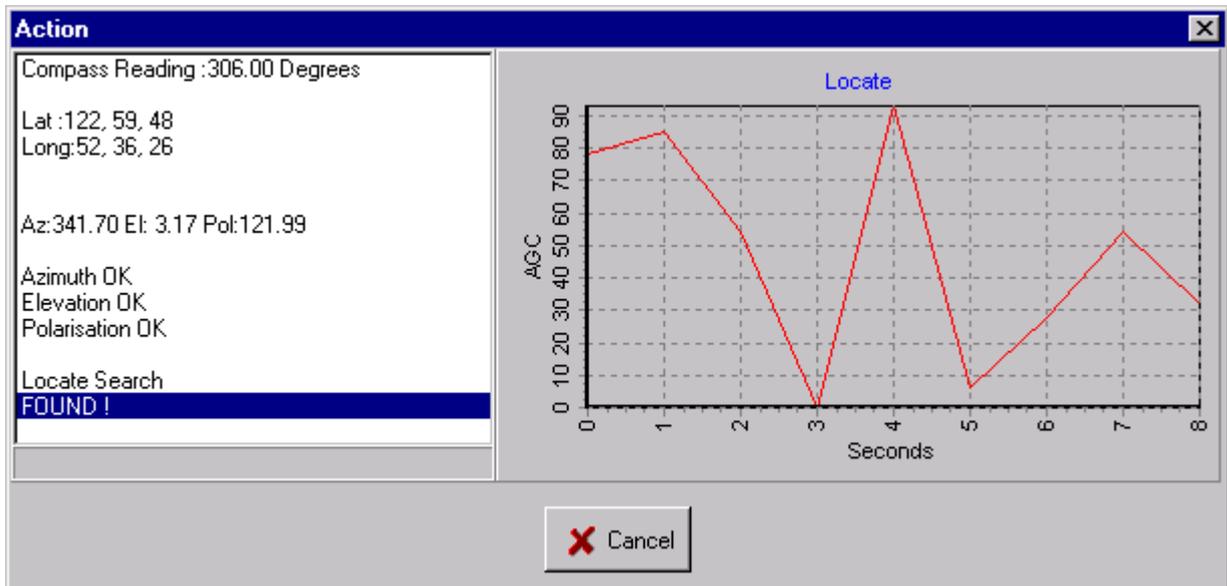
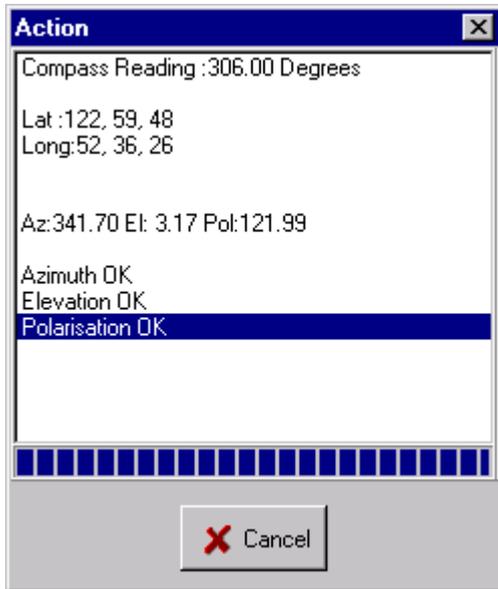
This menu option invokes Program-Track or Beacon-Track operation.

2.6 Control | Calibrate

This menu option is disabled for 1m dishes.

2.7 Control | Auto Locate

Allows the user to instigate the following sequence:



2.8 Search | Track

Allows the user to set the following information used in 2m dish inclined orbit tracking systems only:

The 'Search - Track' dialog box is titled 'Search - Track' and has a close button (X) in the top right corner. It is divided into three main sections: 'Step', 'Area', and 'Time'.
- The 'Step' section contains two rows of input fields. The first row is labeled 'Width:' and has fields for '0' Degr, '0' Mins, and '0' Secs. The second row is labeled 'Length:' and has fields for '0' Degr, '0' Mins, and '0' Secs.
- The 'Area' section also contains two rows of input fields. The first row is labeled 'Width:' and has fields for '0' Degr, '0' Mins, and '0' Secs. The second row is labeled 'Length:' and has fields for '0' Degr, '0' Mins, and '0' Secs.
- The 'Time' section has a single input field labeled '0' Secs.
At the bottom of the dialog are two buttons: 'OK' with a green checkmark icon and 'Cancel' with a red X icon.

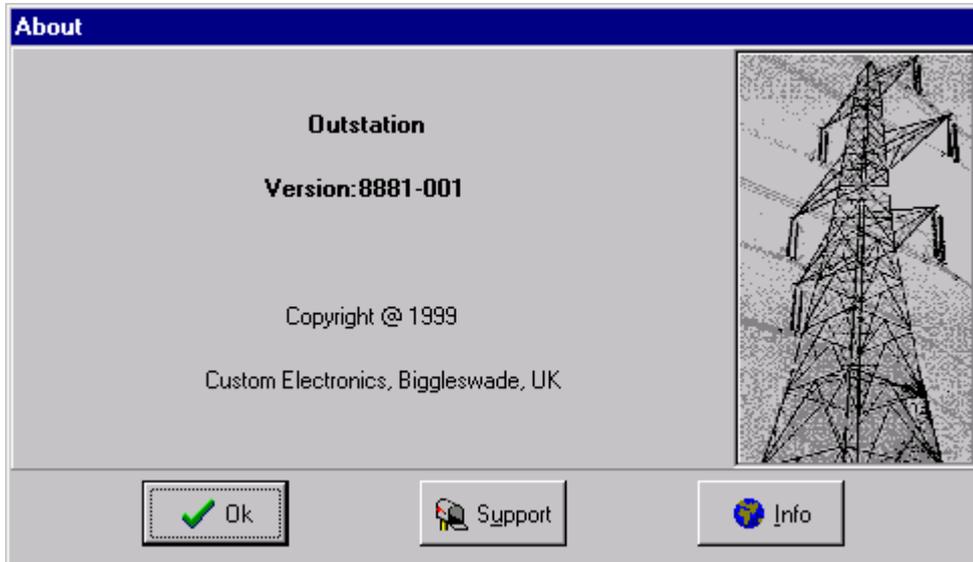
2.9 Search | Locate

Allows the user to view the following information used in the locate function. The Area settings determine the limits of Azimuth (Length) and Elevation (Width) for the search. The Step settings determine the steps of Azimuth (Length) and Elevation (Width) in the search. :

The 'Search - Locate' dialog box is titled 'Search - Locate' and has a close button (X) in the top right corner. It is divided into two main sections: 'Step' and 'Area'.
- The 'Step' section contains two rows of input fields. The first row is labeled 'Width:' and has fields for '0' Degr, '0' Mins, and '0' Secs. The second row is labeled 'Length:' and has fields for '0' Degr, '0' Mins, and '0' Secs.
- The 'Area' section also contains two rows of input fields. The first row is labeled 'Width:' and has fields for '0' Degr, '0' Mins, and '0' Secs. The second row is labeled 'Length:' and has fields for '0' Degr, '0' Mins, and '0' Secs.
At the bottom of the dialog are two buttons: 'OK' with a green checkmark icon and 'Cancel' with a red X icon.

2.10 Help | About

Allows the user to view the information about this product:



3 Getting Started

3.1 System Requirements

- 8881 Pylon EPC Outstation
- 1MB of free mass storage

3.2 Installation

The application comes pre-installed from the factory.

3.3 Quickstart - Operating Procedure

The procedure for operation can be summarised as follows:

1. Switch on the power to the controller and wait for it to boot the operating system
2. 8881 EPC Software will start automatically
3. Deploy the antenna using the DEPLOY button
4. Reset any last calibration using the CONFIRM then RESET buttons
5. Obtain and check the Gps and Compass values using the READ button
6. Select a satellite from the database
7. Use the POINT button to point the dish toward the satellite
8. Acquire the best signal from a strong satellite, if you have an analog beacon receiver use the ACQUIRE button, otherwise manually adjust the azimuth then elevation to obtain the best signal.
9. Confirm the calibration using the CONFIRM button
10. Repeat from step 6 if a different satellite is required
11. When finished – stow the antenna using the STOW button
12. Shutdown the windows operating system
13. Switch off the power

4 Operation with Inclined Orbit Satellites

The controller has facilities for both Program-Track and Step-Track operation with satellites on inclined orbits.

“Program Track” operation simply requires a series of theoretical position offsets from the nominal satellite position to be known, whilst “Step Track” requires the use of a compatible beacon receiver with digital output and is combined with the Program Track operation.

4.1 Setting up Program Track

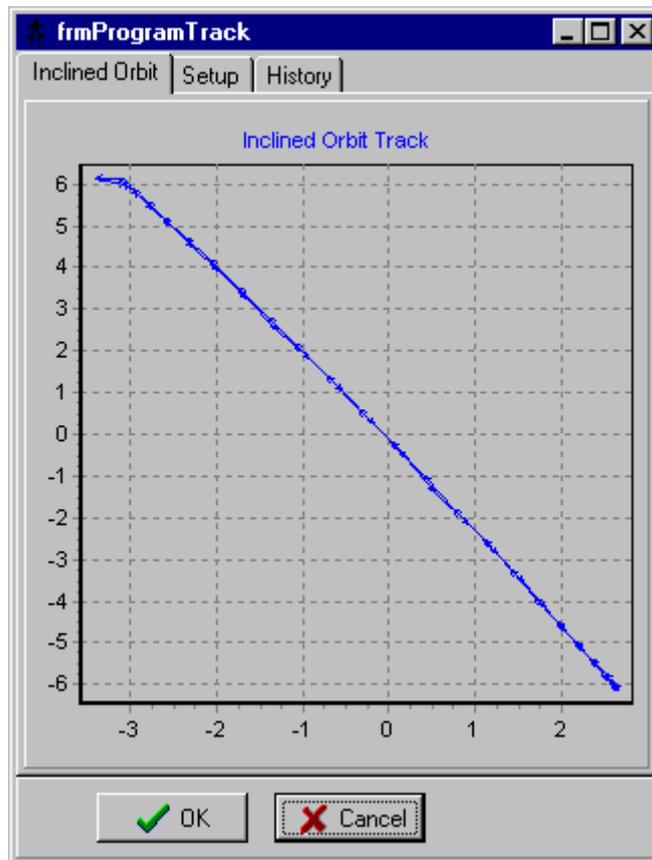
This is accessed from the main system menu using the Edit | ProgramTrack option. This brings up a form for configuring the program track facilities which includes three tabs – one for “Inclined Orbit”, one for “Setup” and one for “History”.

TimeOfDay	EIOffset	AzOffset
00:00:00	2.8	-1.39
00:30:00	3.5	-1.74
01:00:00	4.15	-2.06
01:30:00	4.69	-2.35
02:00:00	5.17	-2.60
02:30:00	5.56	-2.80
03:00:00	5.85	-2.96
03:30:00	6.04	-3.07
04:00:00	6.13	-3.12
04:30:00	6.12	-3.4
05:00:00	5.99	-3.04

In edit mode, the Setup tab of this form is invoked automatically. The Set includes facilities to enable or disable the program track mode, to enable or disable the use of a beacon receiver, and to set the track interval in minutes. An information grid is given which holds data co-ordinates for the program track use. These consist of the time of day, an azimuth offset and an elevation offset from the nominal satellite reference position.

There are 30 minute intervals between these data points and in edit mode the azimuth and elevation offset can be altered by editing the values within the grid. If the Apply button is pushed these

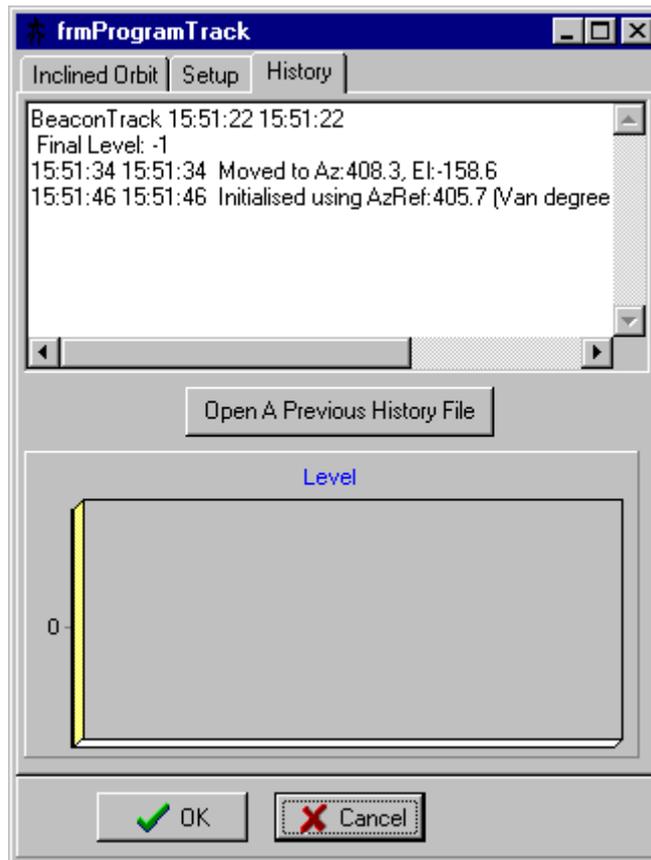
contents are written to the default “programtrack.trk” file. This also updates the chart contained on the inclined orbit graph tab.



There are also facilities to save the program track data away to an alternative file name, (e.g. W2_16E.trk, Eutelsat2F3_21.5E.trk, Eutelsat1F4_33E.trk etc) using the “Save” button. Similarly a “Select” button allows the operator to load in a file previously saved in this manner.

There is also a control on this form to choose to “Clear” the contents of the grid. This sets offset entries to zero in all positions. This is used principally in step-track mode when the data is known to be obsolete and needs to be refreshed so that it can be relied on for fall back into program track mode when the beacon receiver is not available.

When the user is complete he exits edit mode using the “Ok” button which confirms all settings, or the “Cancel” button which leaves without writing the settings to file.



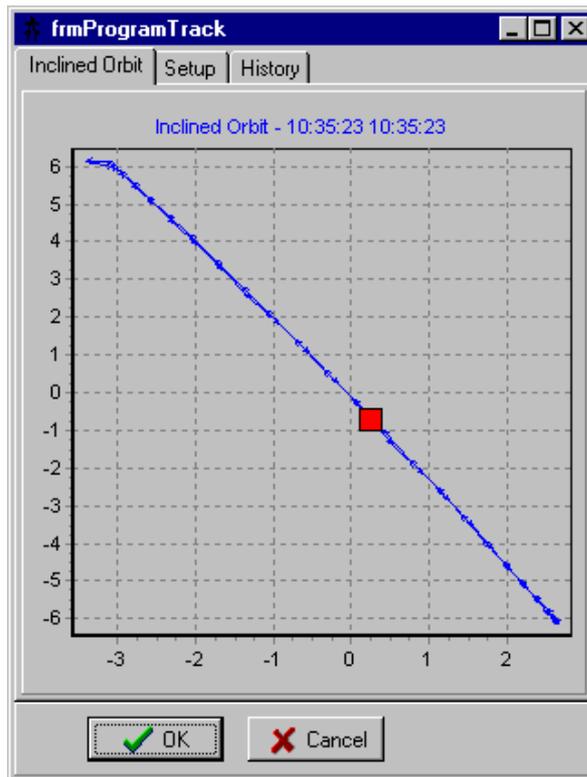
During edit mode the user can navigate to the “History” tab. This allows a history window to be examined, which gives the facility to load a previously stored history file. When beacon track or program track operations are used the details of the adjustments made and the levels found are recorded in the history file shown on the history tab. The contents of this file are saved automatically by the system on exit, to a filename comprising the date and time and the extension “.txt”. These files can be reopened for inspection at later dates by the operator in program track edit mode, on the history tab, by using the “Open a previous history file” button.

4.2 Using Program Track

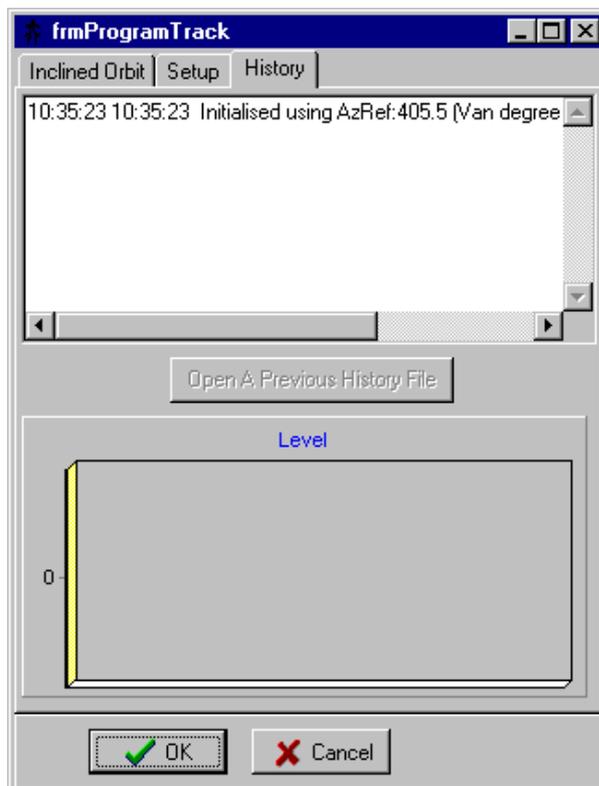
To use program track, the operator firstly points to, peaks up and confirms on the satellite of interest. If a beacon receiver is used, it is tuned and locked to the relevant beacon frequency and connected to com2:9600,n,8,1.

Program-Track mode is started using the main menu “Control | Program Track” option.

There are two modes of track operation, one step-tracks using the beacon receiver (when the beacon receiver check box is selected on set-up) and the other program-tracks using pre-defined theoretical positional co-ordinates for the satellite.



In program track mode, the “ProgramTrack.trk” file details (from the set up mode on edit | program track) are used to interpolate between the co-ordinates at the interval given. Each interval, the software calculates the relative moves to the current position and then adjusts the antenna position to the satellite accordingly. It then uses a series of P+I integrating pulses to fine-tune the position to achieve the desired position. The track history can be inspected on the history tab which is saved on exit.



4.3 Step-Tracking with a Beacon Receiver

An alternative to simple program-track mode is to step-track using the beacon receiver to follow the satellite automatically. This mode is set by checking the “Beacon Track” checkbox during set-up, and is invoked in the same way as Program-Track above.

At each interval, the software monitors the beacon level and performs a series of small adjustments, to firstly the elevation, then the azimuth in order to climb to the peak of the signal. Once this position is reached the system goes idle until the next interval.

During beacon track mode of operation, the positions calculated as relative offsets from the starting position are written into the “ProgramTrack.trk” file and also recorded on the data grid in the set up screen. In this way, after step-tracking using a beacon receiver for a 24 hour period, the system has built up a program-track compatible data file which can then be used later in program track mode if desired.

In the case of a failure or unavailability of the beacon receiver, or the loss of its signal, the software will automatically fall back to program-track using the data held in the set-up, and also automatically revert back to step track, if the signal subsequently becomes available again.

5 Getting Support

To offer the best level of support, Custom Electronics recommend the following:

1. First refer to the FAQ section of this manual for answers to frequently asked questions.
2. Next refer to the latest Pylon 8881 EPC FAQs in the tech support section of our website at the following address: [HTTP://www.customelectronic.demon.co.uk](http://www.customelectronic.demon.co.uk). Unanswered questions can be referred to us by either of the following:
 - E-mail to: support@customelectronic.demon.co.uk. This will be answered by E-mail at the earliest opportunity and is provided free of charge to all registered users.
 - Telephone to Pylon ENG Technical Support at +44 1767 313167. This service is chargeable per minute and available at reduced rates to holders of the relevant support contracts.

6 Frequently Asked Questions (FAQ's)

6.1 How do I install a software update?

If your EPC controller system is fitted with the floppy disk drive option, simply exit the software application using the File | Exit option and copy the file from A: to C:

Otherwise connect a PC to the EPC controller via Com1: using a file transfer (cross-over) cable and use Hyperterm or the PylonXFR utility. (See 5.2)

6.2 How Do I Use the PylonXFR Utility?

PylonXFR is a utility which allows terminal emulation and file transfer to and from the EPC outstation Com: ports. It has several versatile modes of operation which allow it to be used in command line or interactive modes, at both the EPC and PC ends, and both with or without a display monitor.

The command line usage is:

```
PylonXFR [comspec] [filespec]
```

The default comspec is COM1:38400,n,8,1

If a [filespec] is given, PylonXFR will SEND the file(s) specified using the Zmodem protocol.

If a [Filespec] is not given, PylonXFR will check the EPC front panel "Enter" push-button, - if the button is pressed PylonXFR will enter Zmodem receive mode and attempt to start a transfer for 60 seconds before leaving.

If the EPC front panel "Menu" push-button is pressed when PylonXFR is run, it will go into interactive mode, allowing operation from the keyboard and display. The menu options given include 1) Setting the comspec, 2) File Receive, 3) File Send, 4) TTY emulation.

At the PC end, PylonXFR can also be used for sending the file updates, as can any other Zmodem compatible software (such as Windows Hyperterminal or Procomm).

Procedures for EPC file update without Keyboard/Monitor/Floppy drive:

This first procedure assumes you have PylonXFR included in the EPC autoexec.bat and Windows Hyperterminal on a PC.

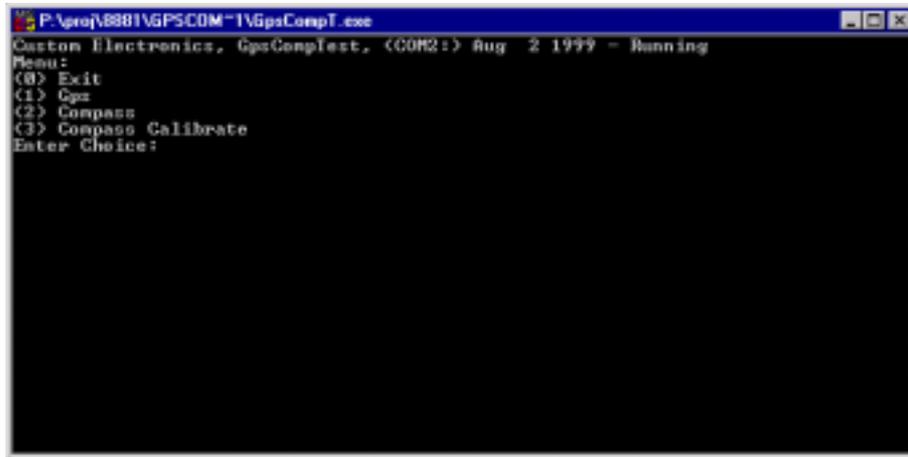
- 1) Connect a PC Com1: to the EPC Com1: port using a standard crossover cable.
- 2) On the PC run Windows Hyperterminal and configure for Com1:38400,n,8,1 and no flow control.
- 3) Hold in the EPC "Enter" push-button and switch on the EPC power. Keep the push-button pressed for 10 seconds, or until a PylonXFR signon message is seen on the PC.
- 4) On the PC in Hyperterminal use the Transfer | Send File menu option to select Zmodem protocol and the Filename you want to upload.
- 5) When the transfer is complete, exit Hyperterminal and restart the EPC controller.

This alternative procedure assumes you have PylonXFR included in the EPC autoexec.bat and PylonXFR and the file(s) to update on a PC floppy disk.

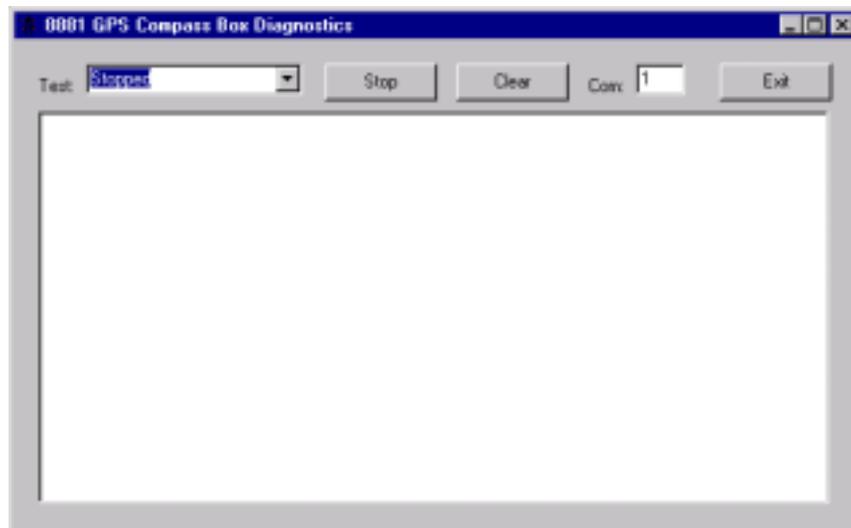
- 1) Connect a PC Com1: to the EPC Com1: port using a standard crossover cable.
- 2) On the PC insert the floppy disk, open a MSDos command prompt window and log onto A:
- 3) Hold in the EPC "Enter" push-button and switch on the EPC power. Keep the push-button pressed for 10 seconds.
- 4) On the PC invoke PylonXFR to send the required files using "PYLONXFR *.EXE"
- 5) When the transfer is complete, exit the MSDos window, and restart the EPC controller.

6.3 How Do I Check the GPS/Compass Unit?

GpsCompT.exe is a DOS utility for Gps, Compass and Compass Calibrate testing. It is located in the 8881 directory and can be run from *Start / Run*.



If under Windows, the com: port resources have been modified, then a Windows version may also be used in the same directory called GpsCompTest.exe.



The desired operation is selected from the Test: combo-box and stopped using the Stop button when complete.

6.4 How do I Calibrate the Compass?

The compass has to be calibrated after the antenna has been installed or whenever its mounting position has been changed. The procedure for calibrating the compass requires that the vehicle perform a number of 360° turns, each lasting at least 2 minutes. The turn doesn't have to be a perfect circle.

The option used for calibrating the compass is (3) above.

6.5 How do I Calibrate A Controller to A Vehicle?

The controller has to be calibrated after the antenna has been installed or whenever its feedback pots or its local controller have been adjusted. – The procedures are as follows:

6.5.1 CML Local Controller Checks

Using only the local controller, before doing the software calibration – check the following.

- Elevation ‘+’ should move the dish upwards and increase the displayed value at 1° per second in slow and 10° per second in fast.
- Elevation ‘-’ should move the dish downwards and decrease the displayed value at 1° per second in slow and 10° per second in fast.
- The ‘+’ and ‘-’ speeds should be equally balanced.
- Polarisation ‘+’ should move the polarisation counter-clockwise and increase the displayed value at 1° per second in slow and 2.5° per second in fast. (Note that clockwise and counter-clockwise are as viewed from the rear of the dish and looking down the feed arm [i.e. you are the dish and the feed arm is extending in front of you]).
- Polarisation ‘-’ should rotate the polarisation clockwise and reduce the displayed value at the same speeds.
- The ‘+’ and ‘-’ speeds should be equally balanced.
- Azimuth ‘+’ should rotate the dish van -Ve degrees and reduce the displayed value at a rate of 1° per second or 10° per second in fast. – (Note: Azimuth van 0 degrees is with the feed arm pointing out of the rear of the van, 90° is pointing out over the kerbside [UK] of the vehicle, 180° is pointing over the front of the vehicle and 270° is pointing over the offside [UK]of the vehicle.
- Azimuth ‘-’ should move the dish van +Ve degrees and increase the displayed value at the same speeds.
- The ‘+’ and ‘-’ speeds should be equally balanced.

6.5.2 Software Calibration Procedure

1. Edit the configuration (password = jenson), set the inclinometer, azimuth, and polarisation to have a ‘multiplier’ of 1 and a ‘constant’ of 0. Select OK.
2. Enter a compass heading of 180.0°.
3. Clear any previous software offsets, using ‘Confirm | Reset’.
4. Use the CML local controller and note the following readings from the status bar of the Pylon SMMC controller software.
 - A) Azimuth reading when feedarm at 0 van degrees (ie rotated all the way round the kerbside [UK] to point directly out of the rear of the vehicle).
 - B) Azimuth reading when feedarm at 360 van degrees (ie rotated past the front of the vehicle, through the offside [UK] to point again directly out of the rear of the vehicle).

- C) Elevation reading when the CML elevation display reads 0°.
- D) Elevation reading when the CML elevation display reads 45°.
- E) Polarisation reading when the CML polarisation display reads 0°.
- F) Polarisation reading when the CML polarisation display reads +90°.

Calculate the multiplier and offset values as follows:

$$\text{Azimuth Multiplier} = 360 / (B - A)$$

$$\text{Azimuth Constant} = -A * \text{Azimuth Multiplier from above}$$

$$\text{Elevation Multiplier} = 45 / (D - C)$$

$$\text{Elevation Constant} = -C * \text{Elevation Multiplier from above}$$

$$\text{Polarisation Multiplier} = 90 / (F - E)$$

$$\text{Polarisation Constant} = -E * \text{Polarisation Multiplier from above}$$

Note that the PylonMXC.exe utility can be used to calculate these as an alternative.

5. Edit the configuration once more and enter the multiplier and constant values from above into the configuration. Select OK.
6. Check that the software status displays for Elevation and Polarisation now correspond to the CML controller. For Azimuth, set the dish to 90 van degrees. Turn the front panel offset on the CML controller to make the displayed value 90° and then rotate the dish to 270° to check that the two stay in step.
7. Check the OK to stow Az and OK to stow Pol software indicators follow the CML local control indicators.
8. Stow the mount and check that the elevation stowed indicator comes in at the bottom limit.
9. Deploy the Antenna again.
10. Enter a correct vehicle heading and GPS location for the software to use. (Note CML factory Heading = 150° when the vehicle nose points down the factory towards reception. Location = N 51 52 45, W 0 24 21.
11. Point to Astra at 19.2°E. (Receiver Frequency: 11627 = Sky News). Locate and Confirm.
12. Point to Hotbird at 13.0°E. (Receiver Frequency: 11224 = TRT).
13. Repeat the above procedure till satisfied with calibration.

A Typical configuration display follows:

The screenshot shows a 'Configuration' dialog box with the following sections and controls:

- Compass:** Available. Comspec:
- GPS:** Available. Comspec:
- Inclometer:** Available. X: mV/Deg. Y: mV/Deg. Multiplier: Constant:
- Azimuth:** Multiplier: Constant:
- Polarization:** Multiplier: Constant:
- AGC:** Multiplier: Constant:
- Auto Track:** Enabled. Satellite:
- Mount Parameters:**
 - Scale:** Azimuth: Counts / Degree. Elevation: Polarization:
 - Home:** Azimuth: Degrees. Elevation: Polarization:
 - Stow:** Azimuth: Degrees. Elevation: Polarization:
- Mount:** 2m / 2.5m 1m

Buttons:

If a beacon receiver is available to give AGC during Aquire mode, then the configuration may be extended to include typical values of AGC | Multiplier = 0.04 and AGC | Constant = -375.967

A Typical .ini file for prop band and dead band values on the motor control follows:

[Aquire]

Enabled=0

[Outstation]

DemoMode=0

[Tolerances]

TimeOut=600

AzimuthPercentTolerance=0.300000011920929

ElevationPercentTolerance=0.300000011920929

PolarizationPercentTolerance=0.300000011920929

HighSpeed=20

AcceptableAGCPercent=20

[Stow]

FastElevationTarget=-50

PolarizationTarget=0

AzimuthTarget=180

[PropBand]

Elevation=128

Polarization=512

Azimuth=48

[DeadBand]

Elevation=16

Polarization=80

Azimuth=12

[TimeOut]

Elevation=60

Polarization=120

Azimuth=60

6.6 What is the Program-Track file structure

This is a simple ASCII text file which can be created from the software, or notepad or a calculation program such as mathcad. – An example is:

```
[PROGTRACK]
ENABLED=1
INTERVAL=60
DATAPOINTS=49
DPT_001=00:00:00,2.8,-1.39
DPT_002=00:30:00,3.5,-1.74
DPT_003=01:00:00,4.15,-2.06
DPT_004=01:30:00,4.69,-2.35
DPT_005=02:00:00,5.17,-2.60
DPT_006=02:30:00,5.56,-2.80
DPT_007=03:00:00,5.85,-2.96
DPT_008=03:30:00,6.04,-3.07
DPT_009=04:00:00,6.13,-3.12
DPT_010=04:30:00,6.12,-3.4
DPT_011=05:00:00,5.99,-3.04
DPT_012=05:30:00,5.77,-2.92
DPT_013=06:00:00,5.41,-2.75
DPT_014=06:30:00,5.02,-2.53
DPT_015=07:00:00,4.51,-2.27
DPT_016=07:30:00,3.93,-1.98
DPT_017=08:00:00,3.28,-1.64
DPT_018=08:30:00,2.51,-1.29
DPT_019=09:00:00,1.82,-0.93
DPT_020=09:30:00,1.04,-0.55
DPT_021=10:00:00,0.24,-0.17
DPT_022=10:30:00,-.57,+0.20
DPT_023=11:00:00,-1.37,+0.52
DPT_024=11:30:00,-2.14,+0.92
DPT_025=12:00:00,-2.87,+1.25
DPT_026=12:30:00,-3.56,+1.55
DPT_027=13:00:00,-4.18,+1.82
DPT_028=13:30:00,-4.73,+2.06
DPT_029=14:00:00,-5.2,+2.26
DPT_030=14:30:00,-5.58,+2.43
DPT_031=15:00:00,-5.87,+2.55
DPT_032=15:30:00,-6.05,+2.63
DPT_033=16:00:00,-6.13,+2.66
DPT_034=16:30:00,-6.11,+2.66
DPT_035=17:00:00,-5.98,+2.60
DPT_036=17:30:00,-5.75,+2.51
DPT_037=18:00:00,-5.42,+2.36
DPT_038=18:30:00,-5.0,+2.18
DPT_039=19:00:00,-4.5,+1.96
DPT_040=19:30:00,-3.91,+1.71
```

```
DPT_041=20:00:00,-3.26,+1.42  
DPT_042=20:30:00,-2.55,+1.11  
DPT_043=21:00:00,-1.80,+0.77  
DPT_044=21:30:00,-1.01,+0.41  
DPT_045=22:00:00,-0.21,+0.04  
DPT_046=22:30:00,0.59,-0.34  
DPT_047=23:00:00,1.39,-0.72  
DPT_048=23:30:00,2.16,-1.09  
DPT_049=24:00:00,2.8,-1.39
```

```
// Integral control params
```

```
FILTER=10  
DEADBAND=0.15  
PROPFACOR=80  
INTFACTOR=80  
BIASFACTOR=10  
DEBUG=0
```

```
[ BEACONTRACK ]
```

```
NOISEBAND=10  
VALIDLEVEL=600  
ELLIMIT=6  
AZLIMIT=25  
ELPULSEWIDTH=15  
AZPULSEWIDTH=10  
FILTERSAMPLS=20  
OPERATORSPEAK=1
```