

**NATIONAL TRANSPORTATION SAFETY BOARD**  
Vehicle Recorders Division  
Washington, D.C. 20594

January 31, 2002

**Specialist's Factual Report of Investigation**  
**Digital Flight Data Recorder**

NTSB Number:  
**DCA01MA064**

**A. EVENT**

Location: Arlington, Virginia  
Date: September 11, 2001  
Aircraft: B-757-200, N644AA  
Operator: American Airlines

**B. GROUP**

N/A

**C. DETAILS OF INVESTIGATION**

In support of the Federal Bureau of Investigation's (FBI's) investigation into the terrorist act of American Airlines Flight 77, which crashed into the Pentagon in Arlington, Virginia, on September 11, 2001, the NTSB Vehicle Recorders Division received the following solid state flight data recorder (SSFDR) on September 14, 2001:

Recorder Manufacturer/Model: **Loral Fairchild Model F-2100**

The SSFDR was examined upon receipt. The recorder displayed evidence of impact, fire, and smoke damage. The memory module was removed as shown in Figures 1 and 2.



Figure 1



Figure 2

The memory module was placed in the laboratory's chassis for L3 Communications solid state flight recorders. The SSFDR data were then transcribed to hard disk for further analysis. The transcribed data were reduced from the recorded binary values (0's and 1's) to engineering units (for example feet, knots, degrees, etc.) using conversion formulas obtained from Boeing and American Airlines for this airplane.<sup>1</sup> The transcribed data were processed by the National Transportation Safety Board's Recovery Analysis and Presentation System (RAPS), which converted the raw data to engineering units and presented it in tabular and graphic form. An examination of the recovered data indicated that the recorder operated normally.

Only validated parameters are included in the plots and tabular data in this report. A list of these parameters is in Attachments I-1 to I-4. The remaining parameters either were not recorded properly or were not confirmed to have been recorded properly, and are not included in this report. A list of these parameters is in Attachments I-5 to I-13.

### Recorder Description

This model SSFDR accepts serial bit stream data in an ARINC 573/717<sup>2</sup> format at a rate of 256 12-bit words per second. The SSFDR uses solid-state Flash Memory technology as the recording medium. The recording is stored in a Crash Survivable

<sup>1</sup> Based on Boeing's 757-3B data frame. See Attachments IV and V: Boeing Document D226A101-3, Rev. G, October 27, 1999 (D226A101-3G.pdf); American Airlines database printout (757-3b\_1.txt).

<sup>2</sup> Flight Data Acquisition and Recording System Characteristic, Published by Aeronautical Radio, Inc. (ARINC), 2551 Riva Road, Annapolis, Maryland

Storage Unit. A minimum of the last 25 hours of operational data is retained on the recording medium.

Prior to recording, the serial data stream is compressed using a modified Hoffman encoding scheme. The data can be decompressed and restored to the original ARINC 575/717 format without any data loss. This requires the use of specialized manufacturers or equivalent software.

The Digital Flight Data Acquisition Unit (DFDAU) provides a means of gathering, conditioning, and converting flight data parameters to digital data. In this aircraft, the DFDAU function is performed by the SSFDR. The DFDAU provides a serial binary digital data stream to the SSFDR at a rate of 3072 bits/sec. A binary, or logical one, is represented by a voltage transition between clock transitions.

The DFDAU input signals are time division multiplexed, with parameter identification established by means of position or time slot addresses in the serial data stream output. This output is a continuous sequence of four-second data frames. Each frame consists of four subframes of 256 separate 12-bit words, with the first word containing a unique 12-bit synchronization (sync) word identifying it as subframe 1,2,3, or 4. The data stream is "in sync" when successive sync words appear at the proper 256-word intervals. If the data stream is interrupted, sync words will not appear at the proper interval or sequence, and the time reference will be lost until the subframe pattern can be reestablished.

### **Time Correlation**

The SSFDR data were correlated to local time (Eastern Daylight Time (EDT)). See the Time Correlation Report for further details on the correlation between SSFDR and local time.

## **Data and Graphs**

Attachments II-1 to II-17 contain plots of those parameters that were recorded and validated. The timeframe of the plots is from 8:19:00 EDT to 9:39:00 EDT, with the last recorded data occurring at 9:37:44 EDT.

The data plotted in Attachment II are available in tabular format as a comma delimited (\*.csv) file in Attachment III.

[original signed]

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Vehicle Recorders Division

Attachments I-1 to I-13:	Parameter Listings
Attachments II-1 to II-17:	Plots of SSFDR Data
Attachment III (electronic):	DCA01MA064_tabular.csv
Attachment IV (electronic):	D226A101-3G.pdf
Attachment V (electronic):	757-3b_1.txt

**Attachment I**

**Parameter Listings**

## Parameters Plotted

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
EFIS L/C-A-1	10 MI RANGE SEL CAPT	FCC R-A-4	ALT MODE OPER
EFIS R/C-A-1	10 MI RANGE SEL F/O	EICAS L/R-A-1	ALTITUDE ALERT
EFIS L/C-A-1	160 MI RANGE SEL CAPT	TCAS	ALTITUDE REPORTING
EFIS R/C-A-1	160 MI RANGE SEL F/O	FCC C-A-4	APPR MODE OPER
EFIS L/C-A-1	20 MI RANGE SEL CAPT	FCC L-A-4	APPR MODE OPER
EFIS R/C-A-1	20 MI RANGE SEL F/O	FCC R-A-4	APPR MODE OPER
EFIS L/C-A-1	40 MI RANGE SEL CAPT	EICAS L/R-A-1	APU BATT VOLTS
EFIS R/C-A-1	40 MI RANGE SEL F/O	EICAS L/R-A-1	APU BLEED VALVE
EFIS L/C-A-1	80 MI RANGE SEL CAPT	EICAS L/R-A-1	APU BUS AC VOLTS
EFIS R/C-A-1	80 MI RANGE SEL F/O	EICAS L/R-A-1	APU BUS FREQ
FCC C-A-4	A/P CMD L ENGA	EICAS L/R-A-1	APU DOOR
FCC L-A-4	A/P CMD L ENGA	EICAS L/R-A-1	APU FUEL SHUTOFF
FCC R-A-4	A/P CMD L ENGA	EICAS L/R-A-1	APU GEN APB OPEN
FCC C-A-4	A/P CMD R ENGA	EICAS L/R-A-1	APU LOAD
FCC L-A-4	A/P CMD R ENGA	EICAS L/R-A-1	APU RPM
FCC R-A-4	A/P CMD R ENGA	EICAS L/R-A-1	AUTOTHROTTLE DISC
FCC C-A-4	A/P ENGAGE DETENT	FCC C-A-4	AUTOTRIM DOWN - ARM
FCC L-A-4	A/P ENGAGE DETENT	FCC L-A-4	AUTOTRIM DOWN - ARM
FCC R-A-4	A/P ENGAGE DETENT	FCC R-A-4	AUTOTRIM DOWN - ARM
FCC C-A-4	A/P T.E. FLAP POSITION	FCC C-A-4	AUTOTRIM DOWN - CONT
FCC L-A-4	A/P T.E. FLAP POSITION	FCC L-A-4	AUTOTRIM DOWN - CONT
FCC R-A-4	A/P T.E. FLAP POSITION	FCC R-A-4	AUTOTRIM DOWN - CONT
EICAS L/R-A-1	A/P WARN-2 BAT	FCC C-A-4	AUTOTRIM UP - ARM
EICAS L/R-A-1	A/P WARN-2 NORM	FCC L-A-4	AUTOTRIM UP - ARM
FCC C-A-4	A/P WARNING	FCC R-A-4	AUTOTRIM UP - ARM
FCC L-A-4	A/P WARNING	FCC C-A-4	AUTOTRIM UP - CONT
FCC R-A-4	A/P WARNING	FCC L-A-4	AUTOTRIM UP - CONT
TMC L-D-4	A/T DISCONNECT	FCC R-A-4	AUTOTRIM UP - CONT
TMC L-D-4	A/T ENGAGE	ADC L/R-A-4	BARO COR NO. 1 (IN)
EEC RR-L-B-2	ACB WHEN ON - L	ADC L/R-A-4	BARO COR NO. 2 (IN)
EEC RR-R-B-2	ACB WHEN ON - R	EICAS L/R-A-1	BLEED DUCT PRESS - L
EEC RR-L-B-2	ACM WHEN ON - L	EICAS L/R-A-1	BLEED DUCT PRESS - R
EEC RR-R-B-2	ACM WHEN ON - R	EICAS L/R-A-1	BLEED ISOL VALVE
EICAS L/R-A-1	AFT FUEL PUMP - L	EICAS L/R-A-1	BUS AC VOLTS - LEFT
EICAS L/R-A-1	AILERON POSN-OUTER - L	EICAS L/R-A-1	BUS AC VOLTS - RIGHT
EICAS L/R-A-1	AILERON POSN-OUTER - R	EICAS L/R-A-1	BUS FREQ-L
A/G RELAY	AIR/GROUND	EICAS L/R-A-1	BUS FREQ-R
EFIS L/C-A-1	AIRPORTS CAPT	SYNCHRO	CAPT CONT COLUMN POSN
EFIS R/C-A-1	AIRPORTS F/O	SYNCHRO	CAPT CONT WHEEL POSN
EICAS L/R-A-1	ALL GEAR DOWN & LOCK	EICAS L/R-A-1	C-L FUEL PUMP LT
FCC C-A-4	ALT HOLD MODE OPER	EICAS L/R-A-1	C-L FUEL PUMP PR
FCC L-A-4	ALT HOLD MODE OPER	TMC L-D-4	CLB MODE OPER
FCC R-A-4	ALT HOLD MODE OPER	ADC L/R-A-4	COMPUTED AIRSPEED
FCC C-A-4	ALT MODE OPER	EICAS L/R-A-1	C-R FUEL PUMP LT
FCC L-A-4	ALT MODE OPER	EICAS L/R-A-1	C-R FUEL PUMP PR

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
FMC L/R-B-1	CREW ALERT LEVEL A	EICAS L/R-A-1	ENG N3-ACTUAL - R
TMC L-D-4	CRZ MODE OPER	EICAS L/R-A-1	ENG N3-ACTUAL - L
FQMS	DENSITY C TANK	EICAS L/R-A-1	ENG OIL PRES - L
FQMS	DENSITY L TANK	EICAS L/R-A-1	ENG OIL PRES - R
FQMS	DENSITY R TANK	EICAS L/R-A-1	ENG OIL QTY - L
FQMS	DENSITY S TANK	EICAS L/R-A-1	ENG OIL QTY - R
TMC L-D-4	DERATE 1 ARMED	EICAS L/R-A-1	ENG OIL TEMP - L
DME L-A-2	DME DISTANCE-LEFT	EICAS L/R-A-1	ENG OIL TEMP - R
DME R-A-2	DME DISTANCE-RIGHT	EICAS L/R-A-1	ENG OUT RLY - L
FMC L/R-D-4	DRIFT ANGLE	EICAS L/R-A-1	ENG OUT RLY - R
TMC L-D-4	ECS PACK H/L LEFT	EICAS L/R-A-1	ENG START VALVE - L
TMC L-D-4	ECS PACK H/L RIGHT	EICAS L/R-A-1	ENG START VALVE - R
EICAS L/R-A-1	ECS PACK OFF - L	EICAS L/R-A-1	ENG VIBRATION - L
EICAS L/R-A-1	ECS PACK OFF - R	EICAS L/R-A-1	ENG VIBRATION - R
TMC L-D-4	ECS PACK ON/OFF LEFT	EEC RR-L-B-2	ENGINE OUT (EO) - L
TMC L-D-4	ECS PACK ON/OFF RIGHT	EEC RR-R-B-2	ENGINE OUT (EO) - R
EICAS L/R-A-1	EEC LIMITER - R	TMC L-D-4	EPR BUG DRIVE LEFT
TMC L-D-4	EEC VALID - L	TMC L-D-4	EPR BUG DRIVE RIGHT
TMC L-D-4	EEC VALID - R	EEC RR-L-B-2	EQUIV PLA-LEFT
EICAS L/R-A-1	EICAS COMPUTER	EEC RR-R-B-2	EQUIV PLA-RIGHT
EICAS L/R-A-1	EICAS DISPLAY STATE LOWER DU	EEC RR-L-B-2	FAN INLET TOTAL TEMP - L
EICAS L/R-A-1	EICAS DISPLAY STATE UPPER DU	EEC RR-R-B-2	FAN INLET TOTAL TEMP - R
EICAS L/R-A-1	ELEC MAN RECORD	EEC RR-L-B-2	FEEDBACK OF HMC TRIM - L
EICAS L/R-A-1	ELEV PCU - L	EEC RR-R-B-2	FEEDBACK OF HMC TRIM - R
EICAS L/R-A-1	ELEV PCU - R	EICAS L/R-A-1	FILTER 1 VIB - L
EICAS L/R-A-1	ELEVATOR POSN - L	EICAS L/R-A-1	FILTER 1 VIB-R
EICAS L/R-A-1	ELEVATOR POSN - R	EICAS L/R-A-1	FILTER 2 VIB - L
EICAS L/R-A-1	ENG BLEED OFF - L	EICAS L/R-A-1	FILTER 2 VIB - R
EICAS L/R-A-1	ENG BLEED OFF - R	EICAS L/R-A-1	FILTER 3 VIB - L
EICAS L/R-A-1	ENG DED GEN - L	EICAS L/R-A-1	FILTER 3 VIB - R
EICAS L/R-A-1	ENG DED GEN - R	FCC C-A-4	FL CH MODE OPER
EICAS L/R-A-1	ENG EGT-LEFT	FCC L-A-4	FL CH MODE OPER
EICAS L/R-A-1	ENG EGT-RIGHT	FCC R-A-4	FL CH MODE OPER
EICAS L/R-A-1	ENG EPR COMMAND - L	TMC L-D-4	FL CH MODE OPER
EICAS L/R-A-1	ENG EPR COMMAND - R	FSEU	FLAP HANDLE POSN
EICAS L/R-A-1	ENG EPR LIMIT-L	EFIS L/C-A-1	FLT DIR - PITCH CAPT
EICAS L/R-A-1	ENG EPR LIMIT-R	EFIS L/C-A-1	FLT DIR - ROLL CAPT
EICAS L/R-A-1	ENG EPR-ACTUAL - L	FCC C-A-4	FLT DIR ON-CAPT
EICAS L/R-A-1	ENG EPR-ACTUAL - R	FCC R-A-4	FLT DIR ON-F/O
EICAS L/R-A-1	ENG FUEL FLOW - L	EICAS L/R-A-1	FMC ANNUNCIATION
EICAS L/R-A-1	ENG FUEL FLOW - R	DFDAU	FRAME COUNTER
EICAS L/R-A-1	ENG LO OIL PRESS - L	EICAS L/R-A-1	FUEL X FEED CLOSED
EICAS L/R-A-1	ENG LO OIL PRESS - R	EFIS R/C-A-1	FULL COMPASS ROSE F/O
EICAS L/R-A-1	ENG N1-ACTUAL - L	EICAS L/R-A-1	FWD ACCESS DR
EICAS L/R-A-1	ENG N1-ACTUAL - R	TMC L-D-4	G/A MODE OPER
EICAS L/R-A-1	ENG N2-ACTUAL - L	FCC C-A-4	G/S MODE OPER
EICAS L/R-A-1	ENG N2-ACTUAL - R	FCC L-A-4	G/S MODE OPER

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
FCC R-A-4	G/S MODE OPER	FCC L-A-4	L NAV MODE OPER
EICAS L/R-A-1	GEAR DISAGREE SYS 1	FCC R-A-4	L NAV MODE OPER
EICAS L/R-A-1	GEAR DISAGREE SYS 2	FSEU	L.E. SLATS EXTEND
EICAS L/R-A-1	GEAR DOORS SYS 1	FSEU	L.E. SLATS PART EXTEND
EICAS L/R-A-1	GEAR DOORS SYS 2	FSEU	L.E. SLATS RETRACTED
EICAS L/R-A-1	GEAR DOWN SYS 1 - L	ACCEL	LATERAL ACCELERATION
EICAS L/R-A-1	GEAR DOWN SYS 1 - N	EICAS L/R-A-1	LDG GEAR LEVER
EICAS L/R-A-1	GEAR DOWN SYS 1 - R	EICAS L/R-A-1	LDG GR LEVER SYS 1
EICAS L/R-A-1	GEAR DOWN SYS 2 - L	EICAS L/R-A-1	LDG GR LEVER SYS 2
EICAS L/R-A-1	GEAR DOWN SYS 2 - N	FCC C-A-4	LOC MODE OPER
EICAS L/R-A-1	GEAR DOWN SYS 2 - R	FCC L-A-4	LOC MODE OPER
EICAS L/R-A-1	GEN GCB OPEN - L	FCC R-A-4	LOC MODE OPER
EICAS L/R-A-1	GEN GCB OPEN - R	ILS C-A-2/MMR C	LOCALIZER DEV
EICAS L/R-A-1	GEN LOAD-L	ILS L-A-2/MMR L	LOCALIZER DEV
EICAS L/R-A-1	GEN LOAD-R	ILS R-A-2/MMR R	LOCALIZER DEV
ILS C-A-2/MMR C	GLIDESLOPE DEV	EFIS L/C-A-1	LOCALIZER DEV CAPT
ILS L-A-2/MMR L	GLIDESLOPE DEV	ACCEL	LONGITUDINAL ACCEL
ILS R-A-2/MMR R	GLIDESLOPE DEV	ADC L/R-A-4	MACH
EFIS L/C-A-1	GLIDESLOPE DEV CAPT	FCC C-A-4	MACH DIG DISC
EICAS L/R-A-1	GROSS WEIGHT	FCC L-A-4	MACH DIG DISC
GPWC L-A-1	GROUND PROX WARNING	FCC R-A-4	MACH DIG DISC
EFIS L/C-A-1	GROUND SPEED CAPT	TMC L-D-4	MACH MODE OPER
FCC C-A-4	HDG HOLD MODE OPER	EFIS L/C-A-1	MAG HEADING CAPT
FCC L-A-4	HDG HOLD MODE OPER	EICAS L/R-A-1	MAIN CARGO DOOR
FCC R-A-4	HDG HOLD MODE OPER	DFDAU	MANUFACTURER CODE
FCC C-A-4	HDG SEL MODE OPER	EFIS L/C-A-1	MAP MODE SELECT CAPT
FCC L-A-4	HDG SEL MODE OPER	EFIS R/C-A-1	MAP MODE SELECT F/O
FCC R-A-4	HDG SEL MODE OPER	EICAS L/R-A-1	MASTER CAUTION LIGHT
EICAS L/R-A-1	HYD PRES - C	WEU WARN	MASTER WARNING CAPT
EICAS L/R-A-1	HYD PRES - L	WEU WARN	MASTER WARNING F/O
EICAS L/R-A-1	HYD PRES - R	VOR L-A-2	MIDDLE MARKER
EICAS L/R-A-1	HYD RSVR PRESS > 55 - C	EICAS L/R-A-1	N GEAR LOCK SYS 1
EICAS L/R-A-1	HYD RSVR PRESS > 55 - L	EICAS L/R-A-1	N GEAR LOCK SYS 2
EICAS L/R-A-1	HYD RSVR PRESS > 55 - R	EFIS R/C-A-1	NAV AIDS F/O
FCC C-A-4	IAS	ADC L/R-A-4	OVERSPEED
FCC L-A-4	IAS	EICAS L/R-A-1	PARKING BRAKE ON
FCC R-A-4	IAS	TCAS	PILOT SL
TMC L-D-4	IAS MODE OPER	EFIS L/C-A-1	PITCH ANGLE CAPT
EICAS L/R-A-1	IDG OIL TEMP-L	EFIS R/C-A-1	PITCH ANGLE F/O
EICAS L/R-A-1	IDG OIL TEMP-R	EFIS L/C-A-1	PLAN MODE SEL CAPT
TMC L-D-4	IDLE THRUST OPER	EFIS R/C-A-1	PLAN MODE SEL F/O
EFIS R/C-A-1	ILS (MOD) MODE SEL F/O	EICAS L/R-A-1	POWER XFER UNIT
ADC L/R-A-4	INDICATED AOA	CONFIG	PRE 97 RULE
TMC L-D-4	ISOLATION VALVE - L	FMC L/R-D-4	PRES POSN LAT
EEC RR-L-B-2	ISOLATION VALVE (IV) OPEN-L	FMC L/R-D-4	PRES POSN LONG
EEC RR-R-B-2	ISOLATION VALVE (IV) OPEN-R	ADC L/R-A-4	PRESSURE ALTITUDE
FCC C-A-4	L NAV MODE OPER	EEC RR-L-B-2	PRSOV OPEN - L

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
EEC RR-R-B-2	PRSOV OPEN - R	TCAS	TCAS FAILURE
GPWC L-A-1	PULL UP	TCAS	TCAS SL
FCC C-A-4	PVD ENABLE	TCAS	TCAS SYSTEM STATUS
FCC L-A-4	PVD ENABLE	GPWC L-A-1	TERRAIN DISPLAY DISCRETE 1 ON
FCC R-A-4	PVD ENABLE	GPWC L-A-1	TERRAIN OVERRIDE
TMC L-D-4	RATING 1 OPER	EICAS L/R-A-1	THR LVR ANG / EQUIV PLA-L
TMC L-D-4	RATING 2 OPER	EICAS L/R-A-1	THR LVR ANG / EQUIV PLA-R
TCAS	REPLY INFORMATION	TMC L-D-4	THROTTLE HLD ANNUN
EFIS L/C-A-1	ROLL ANGLE CAPT	TMC L-D-4	THRUST MODE OPER
EICAS L/R-A-1	RUDDER PCU	TMC L-D-4	TMC V-NAV OPER
SYNCHRO	RUDDER PEDAL POSITION	ADC L/R-A-4	TOTAL AIR TEMP
EICAS L/R-A-1	RUDDER POSITION	ADC L/R-A-4	TOTAL PRESSURE
ILS C-A-2/MMR C	SEL RWY HDG	FMC L/R-D-4	TRACK ANGLE MAG
ILS L-A-2/MMR L	SEL RWY HDG	FMC L/R-D-4	TRACK ANGLE TRUE
ILS R-A-2/MMR R	SEL RWY HDG	ADC L/R-A-4	TRUE AIRSPEED
VOR L-A-2	SELECTED COURSE - CAPT	EFIS L/C-A-1	TRUE HEADING CAPT
TMC L-D-4	SHUTOFF VALVE LEFT	EICAS L/R-A-1	UTIL BUS OFF - L
TMC L-D-4	SHUTOFF VALVE RIGHT	EICAS L/R-A-1	UTIL BUS OFF - R
GPWC L-A-1	SINK RATE	FCC C-A-4	V NAV MODE OPER
SYNCHRO	STAB POSITION	FCC L-A-4	V NAV MODE OPER
ADC L/R-A-4	STATIC AIR TEMP	FCC R-A-4	V NAV MODE OPER
EEC RR-R-B-2	SUPERVISORY FAIL FIXED - R	FCC C-A-4	V/S MODE
TMC L-D-4	T/O MODE OPER	FCC L-A-4	V/S MODE
FCC C-A-4	T/O MODE OPER-P	FCC R-A-4	V/S MODE
FCC L-A-4	T/O MODE OPER-P	ACCEL	VERTICAL ACCELERATION
FCC R-A-4	T/O MODE OPER-P	L VHF	VHF LEFT KEYING
FCC C-A-4	T/O MODE OPER-R	EFIS L/C-A-1	VOR (MOD) MODE SEL CAPT
FCC L-A-4	T/O MODE OPER-R	VOR L-A-2	VOR FREQUENCY-LEFT
FCC R-A-4	T/O MODE OPER-R	FMC L/R-D-4	WIND DIRECTION TRUE
EICAS L/R-A-1	T/R DEPLOYED - L	FMC L/R-D-4	WIND SPEED
EICAS L/R-A-1	T/R DEPLOYED - R	EFIS R/C-A-1	WPT F/O
EICAS L/R-A-1	T/R INTRANSIT - L	EFIS L/C-A-1	WXR DATA CAPT
EICAS L/R-A-1	T/R INTRANSIT - R	EFIS R/C-A-1	WXR DATA F/O

## Parameters Not Working or Unconfirmed

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
ILS C-A-2/MMR C	#1 ANTENNA SELECTED	EICAS L/R-A-1	AFT CARGO DOOR #2
ILS L-A-2/MMR L	#1 ANTENNA SELECTED	EICAS L/R-A-1	AFT CARGO FIRE
ILS R-A-2/MMR R	#1 ANTENNA SELECTED	EICAS L/R-A-1	AFT ENTRY DOOR - L
EFIS L/C-A-1	5 MI RANGE SEL CAPT	EICAS L/R-A-1	AFT ENTRY DOOR - R
EFIS R/C-A-1	5 MI RANGE SEL F/O	EICAS L/R-A-1	AFT EQUIP SMOKE
A/C IDENT	A/C NUMBER	EICAS L/R-A-1	AFT FUEL PUMP - R
A/C IDENT	A/C TYPE	HUD-1	AIII CAPABILITY HUD
FCC C-A-4	A/P CAUTION	HUD-1	AIII MODE HUD
FCC L-A-4	A/P CAUTION	TMC L-D-4	AIR DRIVEN PUMP
FCC R-A-4	A/P CAUTION	T.E. FLAP SW	ALT FLAPS ARM
FCC C-A-4	A/P CMD C ENGA	MCP A-A-2	ALT HOLD MODE OPER
FCC L-A-4	A/P CMD C ENGA	L.E. FLAP SW	ALT SLATS ARM
FCC R-A-4	A/P CMD C ENGA	TCAS	ALTITUDE SELECT
MCP A-A-2	A/P CMD C ENGA	FMC L/R-B-1	ALTITUDE SELECTED-AUTO
MCP A-A-2	A/P CMD L ENGA	FCC C-A-4	ALTITUDE SELECTED-MAN
MCP A-A-2	A/P CMD R ENGA	FCC L-A-4	ALTITUDE SELECTED-MAN
FCC C-A-4	A/P CWS C ENGA	FCC R-A-4	ALTITUDE SELECTED-MAN
FCC L-A-4	A/P CWS C ENGA	MCP A-A-2	ALTITUDE SELECTED-MAN
FCC R-A-4	A/P CWS C ENGA	EICAS L/R-A-1	ALTN EICAS COMP
MCP A-A-2	A/P CWS C ENGA	EICAS L/R-A-1	ANTI-SKID
FCC C-A-4	A/P CWS L ENGA	EICAS L/R-A-1	ANTI-SKID ALTN
FCC L-A-4	A/P CWS L ENGA	EICAS L/R-A-1	ANTI-SKID SWITCH
FCC R-A-4	A/P CWS L ENGA	ADC L/R-A-4	AOA HEAT ON - #1
MCP A-A-2	A/P CWS L ENGA	ADC L/R-A-4	AOA HEAT ON - #2
FCC C-A-4	A/P CWS R ENGA	EICAS L/R-A-1	AOA PROBE HEAT - L
FCC L-A-4	A/P CWS R ENGA	EICAS L/R-A-1	AOA PROBE HEAT - R
FCC R-A-4	A/P CWS R ENGA	HUD-1	APPROACH WARNING HUD
MCP A-A-2	A/P CWS R ENGA	EICAS L/R-A-1	APU EGT
MCP A-A-2	A/P T.E. FLAP POSITION	EICAS L/R-A-1	APU FAULT
TMC L-D-4	A/T G/A MODE ANNUN	EICAS L/R-A-1	APU FAULT (MAINT)
EICAS L/R-A-1	AC BUS OFF - L	EICAS L/R-A-1	APU FIRE
EICAS L/R-A-1	AC BUS OFF - R	EICAS L/R-A-1	APU FIRE LOOP 1
EICAS L/R-A-1	AC BUS TIE ISOL - L	EICAS L/R-A-1	APU FIRE LOOP 2
EICAS L/R-A-1	AC BUS TIE ISOL - R	EICAS L/R-A-1	APU LOW OIL QUANT
DFDAU	ACMS S/W P/N CODE	EICAS L/R-A-1	APU MAN RECORD
FMC L/R-D-4	ACTUAL NAV PERF-(ANP)	EICAS L/R-A-1	APU OIL LEVEL
ADC L/R-A-4	ADC INVALID	FMC L/R-B-1	ASSUMED TEMP
EFIS L/C-A-1	ADC SELECT CAPT	FCC C-A-4	ATT HOLD MODE OPER
EFIS R/C-A-1	ADC SELECT F/O	FCC L-A-4	ATT HOLD MODE OPER
ADC SW	ADC SELECT SW-CAPT	FCC R-A-4	ATT HOLD MODE OPER
EFIS L/C-A-1	ADF/ VOR SEL CAPT	EICAS L/R-A-1	AUTO BRAKE
EFIS R/C-A-1	ADF/ VOR SEL F/O	EICAS L/R-A-1	AUTO SPEEDBRAKE
TCAS	ADV ALT RATE	AUTOBRK SW	AUTO SPEEDBRAKE EXTEND
EICAS L/R-A-1	AFT CARGO DOOR	AUTOBRK SEL-1	
EICAS L/R-A-1	AFT CARGO DOOR #1	AUTOBRK SEL-2	

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
AUTOBRK SW	AUTOBRK SEL-3	HUD-1	COMBINER POSITION HUD
AUTOBRK SW	AUTOBRK SEL-4	EFIS L/C-A-1	COMPAR ENABLE CAPT
AUTOBRK SW	AUTOBRK SEL-DISARM	EFIS R/C-A-1	COMPAR ENABLE F/O
AUTOBRK SW	AUTOBRK SEL-MAX AUTO	EFIS L/C-A-1	COMPARATOR FAIL CAPT
AUTOBRK SW	AUTOBRK SEL-OFF	EFIS R/C-A-1	COMPARATOR FAIL F/O
AUTOBRK SW	AUTOBRK SEL-RTO	TMC L-D-4	CON MODE OPER
FCC C-A-4	AUTOLAND WARN LT	F SENSOR	CONTROL WHEEL FORCE CAPT
FCC L-A-4	AUTOLAND WARN LT	F SENSOR	CONTROL WHEEL FORCE F/O
FCC R-A-4	AUTOLAND WARN LT	EEC RR-L-B-2	COWL A/I ON - L
HUD-1	AUTOPilot ENGAGED HUD	EEC RR-R-B-2	COWL A/I ON - R
HUD-1	AUTOThROTTLE ENGD HUD	TMC L-D-4	COWL ANTI-ICE - L
EICAS L/R-A-1	AVM ALERT - ENG 1	TMC L-D-4	COWL ANTI-ICE - R
EICAS L/R-A-1	AVM ALERT - ENG 2	EFIS L/C-A-1	CP FAULT - LEFT
FCC C-A-4	B/CRS MODE OPER	EFIS R/C-A-1	CP FAULT - RIGHT
FCC L-A-4	B/CRS MODE OPER	EICAS L/R-A-1	CREW OXY PRESSURE
FCC R-A-4	B/CRS MODE OPER	EICAS L/R-A-1	CSEU PSU MODULE - L
HUD-1	BIT FAULT HUD	EICAS L/R-A-1	CSEU PSU MODULE - R
EICAS L/R-A-1	BLEED DUCT LEAK - L	EICAS L/R-A-1	CTR ENTRY DOOR - L
EICAS L/R-A-1	BLEED DUCT LEAK - R	EICAS L/R-A-1	CTR ENTRY DOOR - R
A/G RELAY	BOGIE TILT LEFT	CONFIG	CUSTOMER UNIQUE FRAME
A/G RELAY	BOGIE TILT RIGHT	ILS C-A-2/MMR C	DATA LINK MODE
PRESS SENSOR	BRAKE PRES ALT-LEFT	ILS L-A-2/MMR L	DATA LINK MODE
PRESS SENSOR	BRAKE PRES ALT-RIGHT	ILS R-A-2/MMR R	DATA LINK MODE
PRESS SENSOR	BRAKE PRES MAIN-LEFT	ILS C-A-2/MMR C	DATA LINK STATUS
PRESS SENSOR	BRAKE PRES MAIN-RIGHT	ILS L-A-2/MMR L	DATA LINK STATUS
EICAS L/R-A-1	BRAKE TEMP LT	ILS R-A-2/MMR R	DATA LINK STATUS
PEDAL SW	BRK PEDAL APP L	CAPT CLOCK	DAY X 1
PEDAL SW	BRK PEDAL APP R	CAPT CLOCK	DAY X10
FQMS	C ACTUAL FUEL QTY	EICAS L/R-A-1	DC BUS TIE
EFIS L/C-A-1	C FCC DATA FAULT CAPT	TMC L-D-4	DERATE 2 ARMED
EFIS L/C-A-1	C IRS DATA FAULT CAPT	FMC L/R-D-4	DESIRED TRACK
FQMS	C TANK LB/KG	EFIS L/C-A-1	DH SELECTED CAPT
EICAS L/R-A-1	CABIN ALT > 10kft	EFIS R/C-A-1	DH SELECTED F/O
EICAS L/R-A-1	CABIN AUTOPRESS 1	FMC L/R-D-4	DISTANCE TO DEST
EICAS L/R-A-1	CABIN AUTOPRESS 2	DME L-A-2	DME ANTENNA FAILURE - L
CAPTADC SW	CAPT AIR DATA SW EE BAY	DME R-A-2	DME ANTENNA FAILURE - R
EICAS L/R-A-1	CAPT INST BUS XFER	DME L-A-2	DME FAILURE - L
EICAS L/R-A-1	CAPT INV DISPLAY	DME R-A-2	DME FAILURE - R
PVDC L-A	CAPTAIN PVD ON	EFIS L/C-A-1	DME SELECTED CAPT
EICAS L/R-A-1	CARGO FIRE SW	EFIS R/C-A-1	DME SELECTED F/O
GPWC L-A-1	CAUTION OBST OR OBSTAHEAD	FMC L/R-D-4	DME/DME
GPWC L-A-1	CAUTION TERRAIN	DFDAU	DOC DEPART
EICAS L/R-A-1	CDU MENU REQUEST	DFDAU	DOC DEST
FMC L/R-B-1	CENTER OF GRAVITY DATA	DFDAU	DOC FLT NUMBER
FMC L/R-B-1	CENTER OF GRAVITY SSM	DFDAU	DOC LEG NUMBER
HUD-1	CLR SUBMODE HUD	GPWC L-A-1	DON'T SINK
TCAS	COMBINED CONT	TCAS	DOWN ADVISORY

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
IRU L-A-3	DRIFT ANGLE	EICAS L/R-A-1	ENG N2 RED - L
EFIS L/C-A-1	EADI FAULT - LEFT	EICAS L/R-A-1	ENG N2 RED - R
EFIS R/C-A-1	EADI FAULT - RIGHT	EICAS L/R-A-1	ENG N3 RED - L
EICAS L/R-A-1	ECS MAN RECORD	EICAS L/R-A-1	ENG N3 RED - R
EICAS L/R-A-1	ECS PACK OVHT - L	EICAS L/R-A-1	ENG OIL FILTER - L
EICAS L/R-A-1	ECS PACK OVHT - R	EICAS L/R-A-1	ENG OIL FILTER - R
EICAS L/R-A-1	EEC LIMITER - L	EICAS L/R-A-1	ENG OIL PRESS RED - L
EFIS SW	EFIS SELECT SW-CAPT	EICAS L/R-A-1	ENG OIL PRESS RED - R
EFIS SW	EFIS SELECT SW-F/O	EICAS L/R-A-1	ENG OIL TEMP RED - L
GPWC L-A-1	EGPWS FUTURE DISC 1	EICAS L/R-A-1	ENG OIL TEMP RED - R
GPWC L-A-1	EGPWS FUTURE DISC 2	EICAS L/R-A-1	ENG STARTER - L
EFIS L/C-A-1	EHSI FAULT - LEFT	EICAS L/R-A-1	ENG STARTER - R
EFIS R/C-A-1	EHSI FAULT - RIGHT	EICAS L/R-A-1	ENG THROTTLE - L
EICAS L/R-A-1	EICAS ALT DISAGREE	EICAS L/R-A-1	ENG THROTTLE - R
EICAS L/R-A-1	EICAS IAS DISAGREE	EICAS L/R-A-1	ENGINE FIRE - L
EICAS L/R-A-1	EICAS OPC PART NUM	EICAS L/R-A-1	ENGINE FIRE - R
EICAS SW	EICAS SELECT SW	TMC L-D-4	ENGINE IDENT
EICAS L/R-A-1	ELECT ACCESS DOOR	EICAS L/R-A-1	ENGINE OVHT - L
EICAS L/R-A-1	ELEV ASYM PROT SYS	EICAS L/R-A-1	ENGINE OVHT - R
EICAS L/R-A-1	ELEV HIGH PRESS - C	EICAS L/R-A-1	EPR TARGET-FMC
EICAS L/R-A-1	ELEV HIGH PRESS - L	EICAS L/R-A-1	EQUIP OVHT
EICAS L/R-A-1	ELEV HIGH PRESS - R	EICAS L/R-A-1	EQUIP SMOKE DET
EICAS L/R-A-1	ELEV LOW PRESS - C	F/O ADC SW	F/O AIR DATA SW EE BAY
EICAS L/R-A-1	ELEV LOW PRESS - L	SYNCHRO	F/O CONT COLUMN POSN
EICAS L/R-A-1	ELEV LOW PRESS - R	SYNCHRO	F/O CONT WHEEL POSN
EICAS L/R-A-1	ELEVATOR FEEL SYSTEM	EICAS L/R-A-1	F/O INST BUS XFER
EICAS L/R-A-1	EMERGENCY LIGHTS	PVDC L-A	F/O PVD ON
EICAS L/R-A-1	ENG EGT RED - L	FMC L/R-B-1	FANS AOC UPLINK RECEIVED
EICAS L/R-A-1	ENG EGT RED - R	FMC L/R-B-1	FANS ATC UPLINK RECEIVED
EICAS L/R-A-1	ENG AVM YEL/WHT - L	EICAS L/R-A-1	FIRE EXT SWITCH - L
EICAS L/R-A-1	ENG AVM YEL/WHT - R	EICAS L/R-A-1	FIRE EXT SWITCH - R
EICAS L/R-A-1	ENG BLEED OVHT - LEFT	MCP A-A-2	FL CH MODE OPER
EICAS L/R-A-1	ENG BLEED OVHT - RIGHT	FCC C-A-4	FLAP LIMIT
EICAS L/R-A-1	ENG FIRE LOOP 1 - L	FCC L-A-4	FLAP LIMIT
EICAS L/R-A-1	ENG FIRE LOOP 1 - R	FCC R-A-4	FLAP LIMIT
EICAS L/R-A-1	ENG FIRE LOOP 2 - L	TMC L-D-4	FLAP LIMIT
EICAS L/R-A-1	ENG FIRE LOOP 2 - R	EICAS L/R-A-1	FLAP LOAD RELIEF
EICAS L/R-A-1	ENG FUEL CUTOFF - L	HUD-1	FLARE COMMAND ACTIVE HUD
EICAS L/R-A-1	ENG FUEL CUTOFF - R	FCC C-A-4	FLARE OPER
EICAS L/R-A-1	ENG FUEL FILTER - L	FCC L-A-4	FLARE OPER
EICAS L/R-A-1	ENG FUEL FILTER - R	FCC R-A-4	FLARE OPER
EICAS L/R-A-1	ENG FUEL PRES - L	MCP A-A-2	FLARE OPER
EICAS L/R-A-1	ENG FUEL PRES - R	TMC L-D-4	FLARE RETARD MODE
EICAS L/R-A-1	ENG FUEL VALVE - L	EEC RR-L-B-2	FLAT RATE MODE OPER - L
EICAS L/R-A-1	ENG FUEL VALVE - R	EEC RR-R-B-2	FLAT RATE MODE OPER - R
EICAS L/R-A-1	ENG NI RED - L	A/C IDENT	FLEET IDENT
EICAS L/R-A-1	ENG NI RED - R	HUD-1	FLIGHT PATH X POSN HUD

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
HUD-1	FLIGHT PATH Y POSN HUD	GPWC L-A-1	GLIDESLOPE
EICAS L/R-A-1	FLT DECK DOOR	GPWC L-A-1	GLIDESLOPE CANCEL
EICAS L/R-A-1	FLT DECK EQ SMOKE	ILS C-A-2/MMR C	GLS MODE
EFIS R/C-A-1	FLT DIR - PITCH F/O	ILS L-A-2/MMR L	GLS MODE
EFIS R/C-A-1	FLT DIR - ROLL F/O	ILS R-A-2/MMR R	GLS MODE
MCP A-A-2	FLT DIR ON-CAPT	CAPT CLOCK	GMT
MCP A-A-2	FLT DIR ON-F/O	ILS C-A-2/MMR C	GNSS MODE
FCC C-A-4	FMA FAULT 1 (CWS)	ILS L-A-2/MMR L	GNSS MODE
FCC L-A-4	FMA FAULT 1 (CWS)	ILS R-A-2/MMR R	GNSS MODE
FCC R-A-4	FMA FAULT 1 (CWS)	FMC L/R-D-4	GPS
FCC C-A-4	FMA FAULT 2 (PTCH)	FMC L/R-D-4	GPS TIME
FCC L-A-4	FMA FAULT 2 (PTCH)	GPWC L-A-1	GPWC FAILURE
FCC R-A-4	FMA FAULT 2 (PTCH)	GPWC L-A-1	GPWS ALERT
FCC C-A-4	FMA FAULT 3 (ROLL)	GPWC L-A-1	GROUND PROX INOP
FCC L-A-4	FMA FAULT 3 (ROLL)	EFIS R/C-A-1	GROUND SPEED F/O
FCC R-A-4	FMA FAULT 3 (ROLL)	ILS C-A-2/MMR C	GS TEST/TUNE INHIBIT
EICAS L/R-A-1	FMC FAIL - L	ILS L-A-2/MMR L	GS TEST/TUNE INHIBIT
EICAS L/R-A-1	FMC FAIL - R	ILS R-A-2/MMR R	GS TEST/TUNE INHIBIT
FMC SW	FMC SELECT SW A-CAPT	HUD-1	GUIDANCE CUE X POSN HUD
FMC SW	FMC SELECT SW B-CAPT	HUD-1	GUIDANCE CUE Y POSN HUD
EFIS L/C-A-1	FMC SELECTED CAPT	MCP A-A-2	HDG HOLD MODE OPER
EFIS R/C-A-1	FMC SELECTED F/O	MCP A-A-2	HDG SEL MODE OPER
DFDAU	FMC/IRU DATA SOURCE	FCC C-A-4	HEADING SELECTED
CONFIG	FRAME SEL	FCC L-A-4	HEADING SELECTED
EICAS L/R-A-1	FSEU FAULT (STATUS)	MCP A-A-2	HEADING SELECTED
EICAS L/R-A-1	FUEL XFEED -AFT	L HF	HF-LEFT KEYING
EICAS L/R-A-1	FUEL CONFIG	R HF	HF-RIGHT KEYING
EICAS L/R-A-1	FUEL QTY IND SYS	EICAS L/R-A-1	HIGH BB ALERT - ENG 1
EICAS L/R-A-1	FUEL XFEED VALVE	EICAS L/R-A-1	HIGH BB ALERT - ENG 2
EFIS L/C-A-1	FULL COMPASS ROSE CAPT	FMC L/R-B-1	HORIZTL STEERING
EICAS L/R-A-1	FWD CARGO DOOR	EICAS L/R-A-1	HYD BRAKE SOURCE
EICAS L/R-A-1	FWD CARGO FIRE	EICAS L/R-A-1	HYD ELEC PUMP OVHT - L
EICAS L/R-A-1	FWD ENTRY DOOR - L	EICAS L/R-A-1	HYD ELEC PUMP OVHT - R
EICAS L/R-A-1	FWD ENTRY DOOR - R	EICAS L/R-A-1	HYD ELEV VALVE - C
EICAS L/R-A-1	FWD EQUIP SMOKE	EICAS L/R-A-1	HYD ELEV VALVE - L
EICAS L/R-A-1	FWD FUEL PUMP	EICAS L/R-A-1	HYD GEN AC FREQ
EICAS L/R-A-1	FWD FUEL X-FEED	EICAS L/R-A-1	HYD GEN AC VOLTS
FCC C-A-4	G/A MODE OPER-P	EICAS L/R-A-1	HYD GEN DC VOLTS
FCC L-A-4	G/A MODE OPER-P	EICAS L/R-A-1	HYD GEN VALVE
FCC R-A-4	G/A MODE OPER-P	EICAS L/R-A-1	HYD GENERATOR
FCC C-A-4	G/A MODE OPER-R	EICAS L/R-A-1	HYD MAN RECORD
FCC L-A-4	G/A MODE OPER-R	EICAS L/R-A-1	HYD PRI PUMP OVHT - LEFT
FCC R-A-4	G/A MODE OPER-R	EICAS L/R-A-1	HYD PRI PUMP OVHT - RIGHT
MCP A-A-2	G/S MODE OPER	EICAS L/R-A-1	HYD PUMP 1 OVHT - CENTER
ILS C-A-2/MMR C	G/S RECEIVER FAIL - C	EICAS L/R-A-1	HYD PUMP 2 OVHT - CENTER
ILS L-A-2/MMR L	G/S RECEIVER FAIL - L	EICAS L/R-A-1	HYD QUANT - C
ILS R-A-2/MMR R	G/S RECEIVER FAIL - R		

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
EICAS L/R-A-1	HYD QUANT - L	FMC L/R-D-4	IRS/MLS
EICAS L/R-A-1	HYD QUANT - R	IRU L-A-3	IRU FAULT
EICAS L/R-A-1	HYD RSVR PRESS < 17 - C	EFIS L/C-A-1	IRU SELECTED CAPT
EICAS L/R-A-1	HYD RSVR PRESS < 17 - L	EFIS R/C-A-1	IRU SELECTED F/O
EICAS L/R-A-1	HYD RSVR PRESS < 17 - R	TMC L-D-4	ISOLATION VALVE - R
EICAS L/R-A-1	HYD SYS LO PRESS - C	FQMS	L ACTUAL FUEL QTY
EICAS L/R-A-1	HYD SYS LO PRESS - L	EFIS L/C-A-1	L ADF DATA FAULT CAPT
EICAS L/R-A-1	HYD SYS LO PRESS - R	EFIS L/C-A-1	L FCC DATA FAULT CAPT
EICAS L/R-A-1	HYD SYS LO QTY - C	EFIS L/C-A-1	L FMC DATA FAULT CAPT
EICAS L/R-A-1	HYD SYS LO QTY - L	EFIS L/C-A-1	L IRS DATA FAULT CAPT
EICAS L/R-A-1	HYD SYS LO QTY - R	MCP A-A-2	L NAV MODE OPER
FCC C-A-4	IAS LIMIT OPER	FQMS	L TANK LB/KG
FCC L-A-4	IAS LIMIT OPER	EFIS L/C-A-1	L VOR DATA FAULT CAPT
FCC R-A-4	IAS LIMIT OPER	EICAS L/R-A-1	L.E. SLAT DISAGREE
EICAS L/R-A-1	ICE DETECTOR - L	FSEU	L.E. SLATS FAIL
EICAS L/R-A-1	ICE DETECTOR - R	FCC C-A-4	LAND 2 (GREEN)
EICAS L/R-A-1	ICING ENGINE/DETECTOR	FCC L-A-4	LAND 2 (GREEN)
EICAS L/R-A-1	ICING WING	FCC R-A-4	LAND 2 (GREEN)
EICAS L/R-A-1	IDG OIL LEVEL - L	FCC C-A-4	LAND 3 (GREEN)
EICAS L/R-A-1	IDG OIL LEVEL - R	FCC L-A-4	LAND 3 (GREEN)
EICAS L/R-A-1	IDG TEMP RISE-L	FCC R-A-4	LAND 3 (GREEN)
EICAS L/R-A-1	IDG TEMP RISE-R	HUD-1	LAND 3 MODE HUD
EFIS L/C-A-1	ILS (MOD) MODE SEL CAPT	EICAS L/R-A-1	LAVATORY SMOKE (C)
EFIS L/C-A-1	ILS (STD) MODE SEL CAPT	EICAS L/R-A-1	LDG CONFIG - GEAR
EFIS R/C-A-1	ILS (STD) MODE SEL F/O	EICAS L/R-A-1	LDG CONFIG-SPD BK
ILS C-A-2/MMR C	ILS FAILURE - C	EICAS L/R-A-1	LE SLATS ASYM
ILS L-A-2/MMR L	ILS FAILURE - L	MCP A-A-2	LOC MODE OPER
ILS R-A-2/MMR R	ILS FAILURE - R	ILS C-A-2/MMR C	LOC RECEIVER FAIL - C
ILS C-A-2/MMR C	ILS FREQ/MLS CHAN/GLS CHAN	ILS L-A-2/MMR L	LOC RECEIVER FAIL - L
ILS L-A-2/MMR L	ILS FREQ/MLS CHAN/GLS CHAN	ILS R-A-2/MMR R	LOC RECEIVER FAIL - R
ILS R-A-2/MMR R	ILS FREQ/MLS CHAN/GLS CHAN	ILS C-A-2/MMR C	LOC TEST/TUNE INHIBIT
ILS C-A-2/MMR C	ILS MODE	ILS L-A-2/MMR L	LOC TEST/TUNE INHIBIT
ILS L-A-2/MMR L	ILS MODE	ILS R-A-2/MMR R	LOC TEST/TUNE INHIBIT
ILS R-A-2/MMR R	ILS MODE	FMC L/R-D-4	LOC/DME MODE OPER
EFIS L/C-A-1	ILS SELECTED CAPT	EICAS L/R-A-1	LOW FUEL QTY
EFIS R/C-A-1	ILS SELECTED F/O	HUD-1	LOW-VISIBILITY TAKEOFF HUD
ILS C-A-2/MMR C	ILS/MLS/GLS MODE SELECTION	LRRA C-A-2	LRRA FAILURE - C
ILS L-A-2/MMR L	ILS/MLS/GLS MODE SELECTION	LRRA L-A-2	LRRA FAILURE - L
ILS R-A-2/MMR R	ILS/MLS/GLS MODE SELECTION	LRRA R-A-2	LRRA FAILURE - R
HUD-1	IMC MODE HUD	LRRA C-A-2	LRRA REVEIVE ANTENNA - C
VOR L-A-2	INNER MARKER	LRRA L-A-2	LRRA REVEIVE ANTENNA - L
FMC L/R-D-4	IRS (3) MODE OPER	LRRA R-A-2	LRRA REVEIVE ANTENNA - R
FMC L/R-D-4	IRS (C) MODE OPER	LRRA C-A-2	LRRA TRANSMIT ANTENNA - C
FMC L/R-D-4	IRS (L) MODE OPER	LRRA L-A-2	LRRA TRANSMIT ANTENNA - L
FMC L/R-D-4	IRS (R) MODE OPER	LRRA R-A-2	LRRA TRANSMIT ANTENNA - R
IRS SW	IRS SELECT SW-CAPT	FCC C-A-4	MACH LIMIT OPER
FMC L/R-D-4	IRS/LOC	FCC L-A-4	MACH LIMIT OPER

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
FCC R-A-4	MACH LIMIT OPER	EFIS L/C-A-1	NAV MODE SEL CAPT
FMC L/R-B-1	MACH SELECTED-AUTO	EFIS R/C-A-1	NAV MODE SEL F/O
MCP A-A-2	MACH SELECTED-MAN	FMC L/R-B-1	NDB EFFECTIVITY DAY
EICAS L/R-A-1	MACH SPEED TRIM	FMC L/R-B-1	NDB EFFECTIVITY MN
EFIS R/C-A-1	MAG HEADING F/O	A/G RELAY	NODE GEAR SQUAT SW
EFIS L/C-A-1	MAG/TRUE DATA CAPT	GPWC L-A-1	NOT USED
EFIS L/C-A-1	MAG/TRUE STATUS CAPT	GPWC L-A-1	OBSTACLE WARNING
EFIS R/C-A-1	MAG/TRUE STATUS F/O	VOR L-A-2	OUTER MARKER
EICAS L/R-A-1	MAIN BATT CURRENT	EICAS L/R-A-1	PASS OXY ON
EICAS L/R-A-1	MAIN BATT DISCH	EICAS L/R-A-1	PASS OXY PRESSURE
EICAS L/R-A-1	MAIN BATT SWITCH	EICAS L/R-A-1	PERF MAN RECORD
EICAS L/R-A-1	MAIN BATT VOLTS	IRU L-A-3	PITCH ANGLE IRU
EICAS L/R-A-1	MAIN CARGO FIRE	FCC C-A-4	PITCH ARM
EICAS L/R-A-1	MAIN PITOT HEAT - LEFT	FCC L-A-4	PITCH ARM
EICAS L/R-A-1	MAIN PITOT HEAT - RIGHT	FCC R-A-4	PITCH ARM
PRESS SW	MAIN/ALT BRAKE SEL	EFIS L/C-A-1	PITCH DISAGREE CAPT
EEC RR-L-B-2	MAINTENANCE REQUIRED - L	EFIS R/C-A-1	PITCH DISAGREE F/O
EEC RR-R-B-2	MAINTENANCE REQUIRED - R	FCC C-A-4	PITCH ENGAGE DETENT CMD
DFDAU	MANDATORY S/W P/N CODE	FCC L-A-4	PITCH ENGAGE DETENT CMD
WHEEL SW	MANUAL STAB TRIM NOSE DOWN	FCC R-A-4	PITCH ENGAGE DETENT CMD
WHEEL SW	MANUAL STAB TRIM NOSE UP	FCC C-A-4	PITCH SERVO CMD
EFIS L/C-A-1	MAP SOURCE CAPT	FCC L-A-4	PITCH SERVO CMD
EFIS R/C-A-1	MAP SOURCE F/O	FCC R-A-4	PITCH SERVO CMD
FMC L/R-B-1	MAX ALTITUDE	GPWC L-A-1	PREDICTIVE WINDSHEAR
FMC L/R-B-1	MAX CLIMB ANGLE	IRU L-A-3	PRES POSN LAT
FMC L/R-B-1	MAX MANEUVER SPEED	IRU L-A-3	PRES POSN LONG
FMC L/R-B-1	MIN MANEUVER SPEED	HUD-1	PRIMARY MODE HUD
FCC C-A-4	MIN SPEED	FQMS	R ACTUAL FUEL QTY
FCC L-A-4	MIN SPEED	EFIS R/C-A-1	R ADF DATA FAULT CAPT
FCC R-A-4	MIN SPEED	EFIS L/C-A-1	R FCC DATA FAULT CAPT
TMC L-D-4	MIN SPEED	EFIS L/C-A-1	R FMC DATA FAULT CAPT
GPWC L-A-1	MINIMUMS	EFIS R/C-A-1	R IRS DATA FAULT CAPT
ILS C-A-2/MMR C	MLS ANTENNA SOURCE	FQMS	R TANK LB/KG
ILS L-A-2/MMR L	MLS ANTENNA SOURCE	EFIS R/C-A-1	R VOR DATA FAULT CAPT
ILS R-A-2/MMR R	MLS ANTENNA SOURCE	EFIS R/C-A-1	RADIO HEIGHT F/O
ILS C-A-2/MMR C	MLS MODE	LRRA C-A-2	RADIO HEIGHT
ILS L-A-2/MMR L	MLS MODE	EFIS L/C-A-1	RADIO HEIGHT CAPT
ILS R-A-2/MMR R	MLS MODE	EICAS L/R-A-1	RAT UNLOCKED
EFIS L/C-A-1	MLS SELECT CAPT	FCC C-A-4	REL L FCC SERVO ENG
EFIS R/C-A-1	MLS SELECT F/O	FCC L-A-4	REL L FCC SERVO ENG
EFIS L/C-A-1	MLS/ILS SOURCE SEL CAPT	FCC R-A-4	REL L FCC SERVO ENG
EFIS R/C-A-1	MLS/ILS SOURCE SEL F/O	FCC C-A-4	REL R FCC SERVO ENG
ILS C-A-2/MMR C	MODE STATUS	FCC L-A-4	REL R FCC SERVO ENG
ILS L-A-2/MMR L	MODE STATUS	FCC R-A-4	REL R FCC SERVO ENG
ILS R-A-2/MMR R	MODE STATUS	FMC L/R-D-4	REQ'D NAV PERF-(RNP)
CAPT CLOCK	MONTH	EFIS R/C-A-1	ROLL ANGLE F/O
EFIS L/C-A-1	NAV AIDS CAPT		

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
IRU L-A-3	ROLL ANGLE IRU	FCC C-A-4	SPEED SELECTED-MAN
FCC C-A-4	ROLL ARM	FCC L-A-4	SPEED SELECTED-MAN
FCC L-A-4	ROLL ARM	FCC R-A-4	SPEED SELECTED-MAN
FCC R-A-4	ROLL ARM	MCP A-A-2	SPEED SELECTED-MAN
EFIS L/C-A-1	ROLL DISAGREE CAPT	TCAS	SPI
EFIS R/C-A-1	ROLL DISAGREE F/O	EICAS L/R-A-1	SPOILER MODULE
FCC C-A-4	ROLL ENGAGE DETENT CMD	SCM	SPOILER PNLS FAIL 1&12
FCC L-A-4	ROLL ENGAGE DETENT CMD	SCM	SPOILER PNLS FAIL 2&11
FCC R-A-4	ROLL ENGAGE DETENT CMD	SCM	SPOILER PNLS FAIL 3&10
FCC C-A-4	ROLL SERVO CMD	SCM	SPOILER PNLS FAIL 4&9
FCC L-A-4	ROLL SERVO CMD	SCM	SPOILER PNLS FAIL 5&8
FCC R-A-4	ROLL SERVO CMD	SCM	SPOILER PNLS FAIL 6&7
WHEEL SW	ROLL TRIM CMD L WING DOWN	EICAS L/R-A-1	SPOILER SYSTEM
WHEEL SW	ROLL TRIM CMD R WING DOWN	FCC C-A-4	STAB POSITION
HUD-1	ROLLOUT ENGAGED HUD	FCC L-A-4	STAB POSITION
FCC C-A-4	ROLLOUT MODE OPER	FCC R-A-4	STAB POSITION
FCC L-A-4	ROLLOUT MODE OPER	MCP A-A-2	STAB POSITION
FCC R-A-4	ROLLOUT MODE OPER	FMC L/R-B-1	STAB TRIM
HUD-1	ROLLOUT WARNING HUD	EICAS L/R-A-1	STAB TRIM FAULT
EICAS L/R-A-1	RSV BRAKE VALVE	EICAS L/R-A-1	STAB TRIM MODULE
EFIS L/C-A-1	RTE DATA CAPT	ADC L/R-A-4	STATIC PRESSURE
EFIS R/C-A-1	RTE DATA F/O	EICAS L/R-A-1	STBY BUS OFF
EICAS L/R-A-1	RUDD RATIO MODULE	AISLE STD SW	STBY STAB TRIM NOSE DOWN
EICAS L/R-A-1	RUDDER RATIO SYS	AISLE STD SW	STBY STAB TRIM NOSE UP
FQMS	S ACTUAL FUEL QTY	STALL WRN	STICK SHAKER - LEFT
FQMS	S TANK LB/KG	STALL WRN	STICK SHAKER - RIGHT
SAM	SAM TRIM DOWN CMD LEFT	EICAS L/R-A-1	STRUT LOOP 1 - L
SAM	SAM TRIM DOWN CMD RIGHT	EICAS L/R-A-1	STRUT LOOP 1 - R
SAM	SAM TRIM UP CMD LEFT	EEC RR-L-B-2	SUPERVISORY FAIL FIXED - L
SAM	SAM TRIM UP CMD RIGHT	EEC RR-L-B-2	SUPERVISORY REVERTED - L
L SATCOM	SATCOM-LEFT KEYING	EEC RR-R-B-2	SUPERVISORY REVERTED-R
R SATCOM	SATCOM-RIGHT KEYING	EEC L-A-1	SURGE DETECTED - L
LAMP RLY	SEAT BELT SIGN	EEC R-A-1	SURGE DETECTED - R
VOR R-A-2	SELECTED COURSE - F/O	EFIS L/C-A-1	SWC SELECT CAPT
ILS C-A-2/MMR C	SELECTED LANDING MODE	EFIS R/C-A-1	SWC SELECT F/O
ILS L-A-2/MMR L	SELECTED LANDING MODE	EICAS L/R-A-1	T.E. FLAP ASYM
ILS R-A-2/MMR R	SELECTED LANDING MODE	SYNCHRO	T.E. FLAP POSITION
EFIS L/C-A-1	SG FAULT- LEFT	EICAS L/R-A-1	T.E. FLAPS DISAGREE
EFIS R/C-A-1	SG FAULT- RIGHT	EEC L-A-1	T/L RSLVR ANGLE-LEFT
GPWC L-A-1	SIREN WINDSHEAR WINDSHEAR	EEC R-A-1	T/L RSLVR ANGLE-RIGHT
FCC C-A-4	SPD BRK HDL POSN	EICAS L/R-A-1	T/O CONFIG FLAPS
FCC L-A-4	SPD BRK HDL POSN	EICAS L/R-A-1	T/O CONFIG PARK BRK
FCC R-A-4	SPD BRK HDL POSN	EICAS L/R-A-1	T/O CONFIG SPOILER
MCP A-A-2	SPD BRK HDL POSN	EICAS L/R-A-1	T/O CONFIG STAB
MCP A-A-2	SPD DISPLAY BLANK	PSEU L	T/R DEPLOYED L INBOARD
TMC L-D-4	SPD LIMIT	PSEU L	T/R DEPLOYED L OUTBOARD
FMC L/R-B-1	SPEED SELECTED-AUTO	PSEU R	T/R DEPLOYED R INBOARD

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
PSEU R	T/R DEPLOYED R OUTBOARD	MCP A-A-2	VERT SPEED SELECTED
PSEU L	T/R STOWED L INBOARD	TCAS	VERTICAL CONTROL
PSEU L	T/R STOWED L OUTBOARD	FMC L/R-D-4	VERTICAL DEVIATION
PSEU R	T/R STOWED R INBOARD	FMC L/R-B-1	VERTICAL STEERING
PSEU R	T/R STOWED R OUTBOARD	C VHF	VHF CENTER KEYING
FMC L/R-B-1	TARGET AIRSPEED	R VHF	VHF RIGHT KEYING
EFIS L/C-A-1	TCAS DATA DISPLAYED CAPT	EICAS L/R-A-1	VIB IDENT - L
EFIS R/C-A-1	TCAS DATA DISPLAYED F/O	EICAS L/R-A-1	VIB IDENT - R
EFIS L/C-A-1	TCAS DATA SELECTED CAPT	HUD-1	VMC MODE HUD
EFIS R/C-A-1	TCAS DATA SELECTED F/O	EFIS R/C-A-1	VOR (MOD) MODE SEL F/O
EFIS L/C-A-1	TCAS DISPLAY SEL CAPT	EFIS L/C-A-1	VOR (STD) MODE SEL CAPT
EFIS R/C-A-1	TCAS DISPLAY SEL F/O	EFIS R/C-A-1	VOR (STD) MODE SEL F/O
GPWC L-A-1	TERRAIN	VOR L-A-2	VOR FAILURE - L
GPWC L-A-1	TERRAIN AHEAD	VOR R-A-2	VOR FAILURE - R
GPWC L-A-1	TERRAIN AHEAD PULL UP	VOR L-A-2	VOR MB FAILURE - L
GPWC L-A-1	TERRAIN AWARENESS INOP	EFIS L/C-A-1	VOR SELECTED CAPT
GPWC L-A-1	TERRAIN AWARENESS NOT AVAIL	EFIS R/C-A-1	VOR SELECTED F/O
EFIS L/C-A-1	TERRAIN DATA DISPLAYED CAPT	FMC L/R-D-4	VOR/DME
EFIS R/C-A-1	TERRAIN DATA DISPLAYED F/O	FMC L/R-D-4	VPATH OPER
EFIS L/C-A-1	TERRAIN DATA SELECTED CAPT	FMC L/R-D-4	VSPEED OPER
EFIS R/C-A-1	TERRAIN DATA SELECTED F/O	EICAS L/R-A-1	WHEEL WELL FIRE
GPWC L-A-1	TERRAIN DISPLAY DISCRETE 2 ON	IRU L-A-3	WIND DIRECTION TRUE
GPWC L-A-1	TERRAIN/OBSTACLE CAUTION	IRU L-A-3	WIND SPEED
GPWC L-A-1	TERRAIN/OBSTACLE WARNING	GPWC L-A-1	WINDSHEAR CAUTION
TMC L-D-4	TMC VALID	GPWC L-A-1	WINDSHEAR INOP
GPWC L-A-1	TOO LOW FLAP	EEC RR-L-B-2	WINDSHEAR WARNING
GPWC L-A-1	TOO LOW GEAR	EEC RR-R-B-2	WING A/I ON - L
GPWC L-A-1	TOO LOW TERRAIN	TMC L-D-4	WING A/I ON - R
HUD-1	TOUCHDOWN HUD	EICAS L/R-A-1	WING ANTI-ICE
IRU L-A-3	TRACK ANGLE MAG	EICAS L/R-A-1	WING SLIDE DOOR - L
IRU L-A-3	TRACK ANGLE TRUE	EICAS L/R-A-1	WING SLIDE DOOR - R
EFIS R/C-A-1	TRUE HEADING F/O	EICAS L/R-A-1	WING TAI VALVE - L
ILS C-A-2/MMR C	TUNING INPUT BUS ACT -C	EICAS L/R-A-1	WING TAI VALVE - R
ILS L-A-2/MMR L	TUNING INPUT BUS ACT -L	EFIS L/C-A-1	WPT CAPT
ILS R-A-2/MMR R	TUNING INPUT BUS ACT -R	EFIS L/C-A-1	WXR DATA DISPLAYED CAPT
EICAS L/R-A-1	TURB OVHT LOOP 1 - L	EFIS R/C-A-1	WXR DATA DISPLAYED F/O
EICAS L/R-A-1	TURB OVHT LOOP 1 - R	EFIS L/C-A-1	WXR DATA SELECTED CAPT
EICAS L/R-A-1	UNSCHED STAB MOVE	EFIS R/C-A-1	WXR DATA SELECTED F/O
TCAS	UP ADVISORY	EFIS L/C-A-1	WXR SELECTED CAPT
MCP A-A-2	V NAV MODE OPER	EFIS R/C-A-1	WXR SELECTED F/O
MCP A-A-2	V/S MODE OPER	FCC C-A-4	YAW ARM
FMC L/R-D-4	VALT OPER	FCC L-A-4	YAW ARM
DFDAU	VENDOR DATABASE CODE	FCC R-A-4	YAW ARM
DFDAU	VENDOR STATUS & DATA	EICAS L/R-A-1	YAW DAMPER - L
FCC C-A-4	VERT SPEED SELECTED	EICAS L/R-A-1	YAW DAMPER - R
FCC L-A-4	VERT SPEED SELECTED	YAW DMPR	YAW DAMPER ENGAGE L
FCC R-A-4	VERT SPEED SELECTED	YAW DMPR	YAW DAMPER ENGAGE R

PORT NAME	PARAMETER ASSIGNMENT	PORT NAME	PARAMETER ASSIGNMENT
EICAS L/R-A-1	YAW DAMPER MODULE	FCC L-A-4	YAW SERVO CMD
FCC C-A-4	YAW ENGAGE DETENT CMD	FCC R-A-4	YAW SERVO CMD
FCC L-A-4	YAW ENGAGE DETENT CMD	WHEEL SW	YAW TRIM CMD L
FCC R-A-4	YAW ENGAGE DETENT CMD	WHEEL SW	YAW TRIM CMD R
FCC C-A-4	YAW SERVO CMD	CAPT CLOCK	YEAR
		FMC L/R-B-1	ZERO FUEL WEIGHT

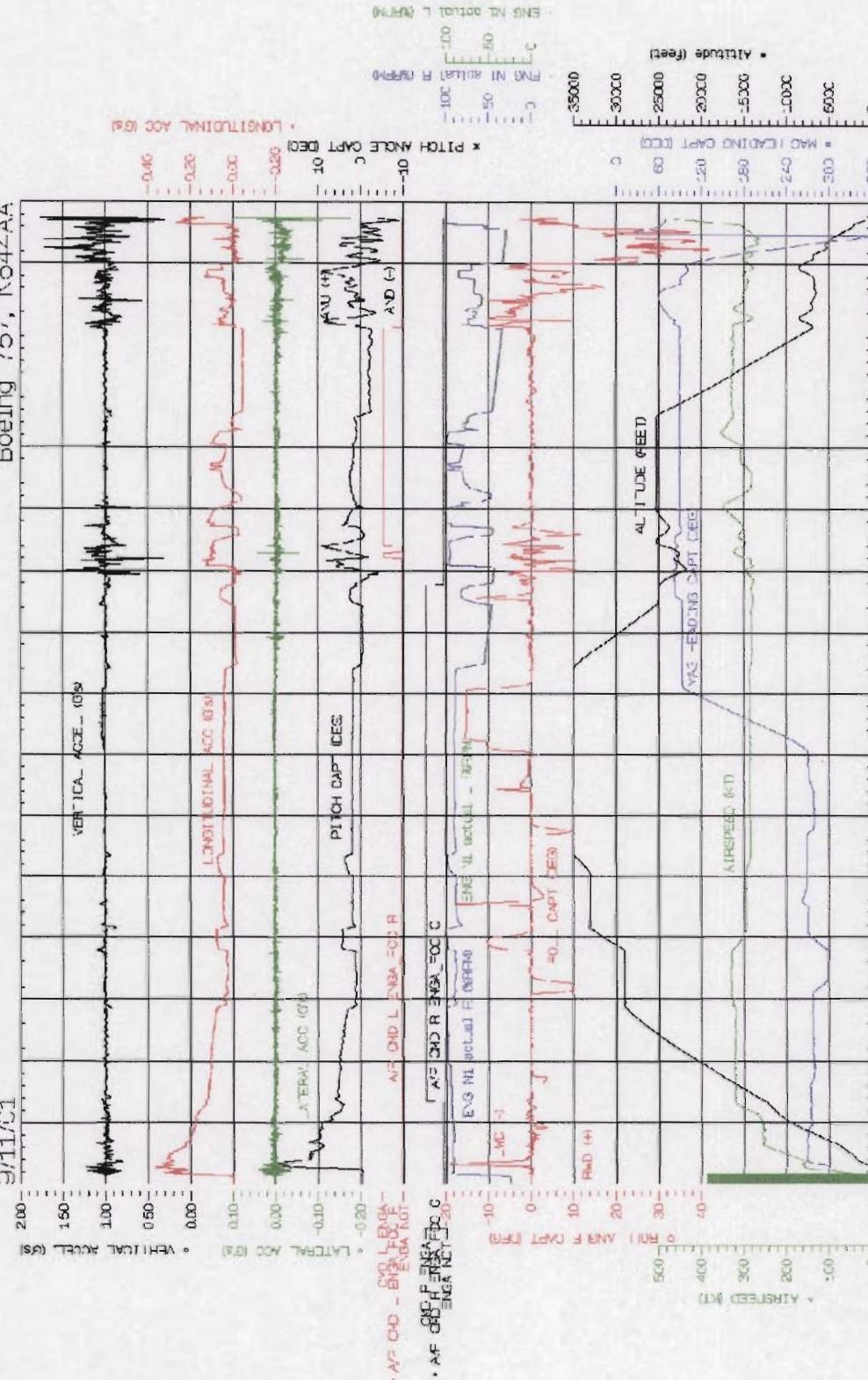
**Attachment II**

**Plots of SSFDR Data**

DCA01MA064

# American Airlines Flight 77, Pentagon

Boeing 757, N647AA

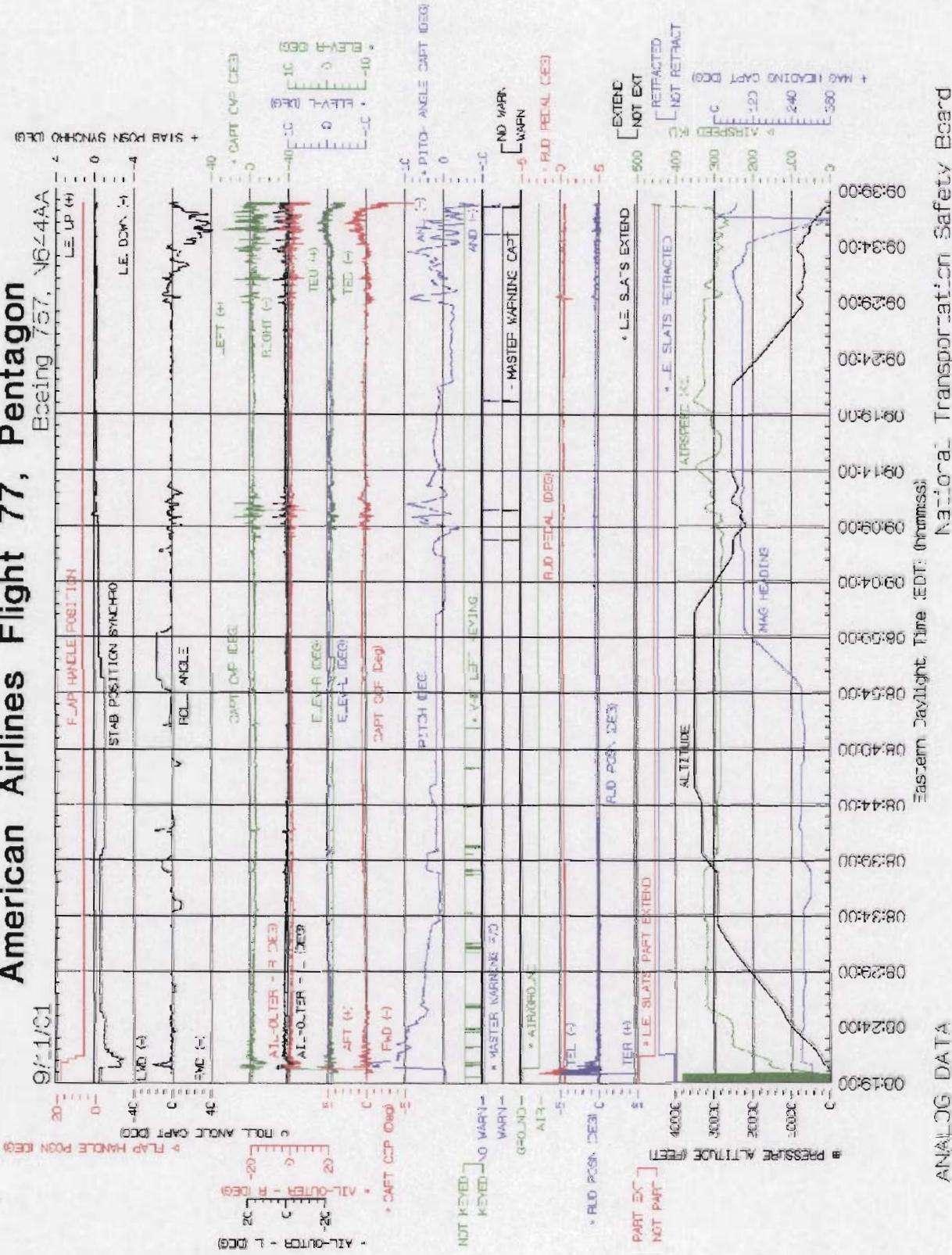


General Parameters

Eastern Daylight Time Intervall

National Transportation Safety Board

# American Airlines Flight 77, Pentagon



ANALOG DATA

National Transportation Safety Board

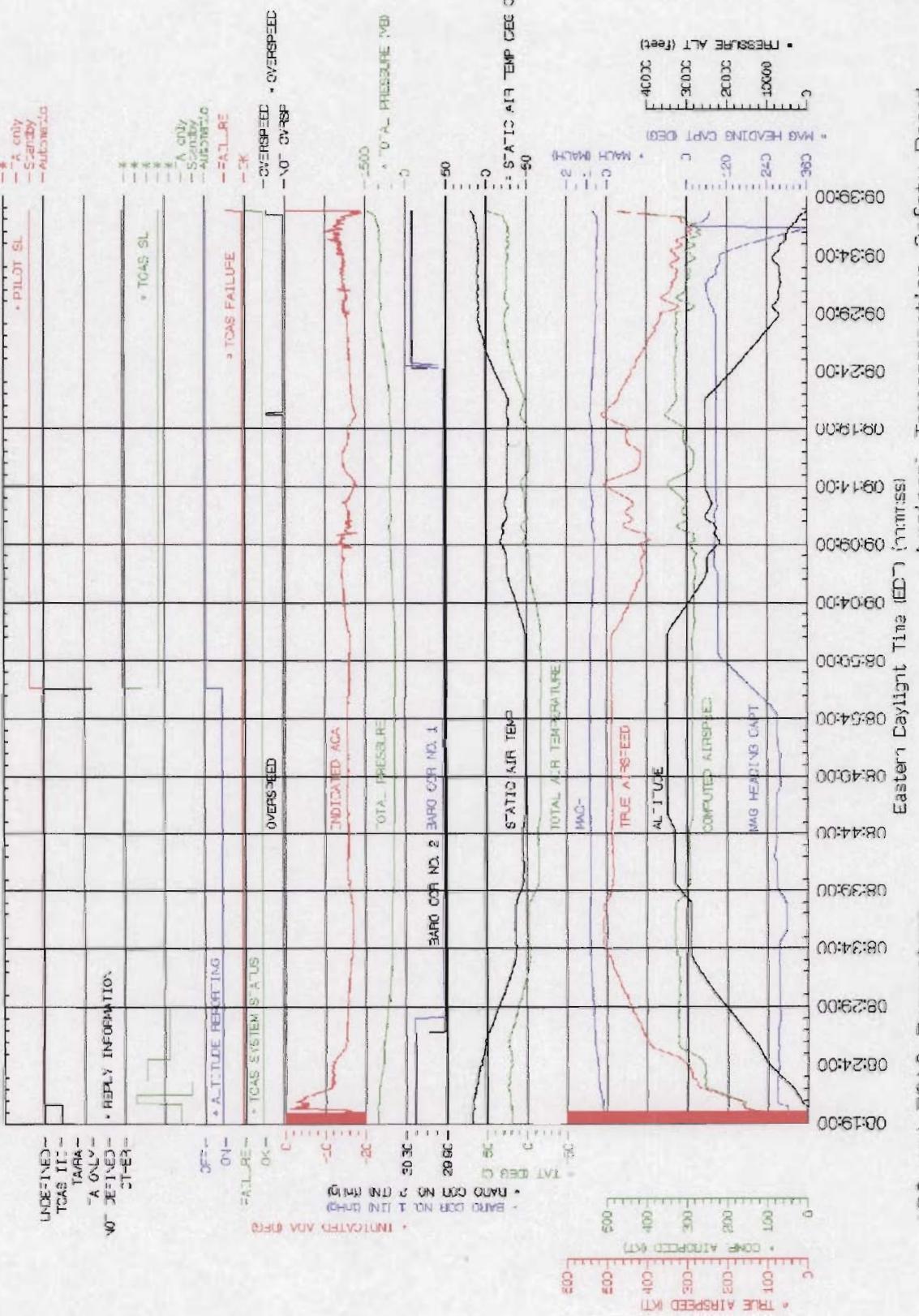
II-2

DCA01MA064

# American Airlines Flight 77, Pentagon

Boeing 757, N644AA

9/11/C1

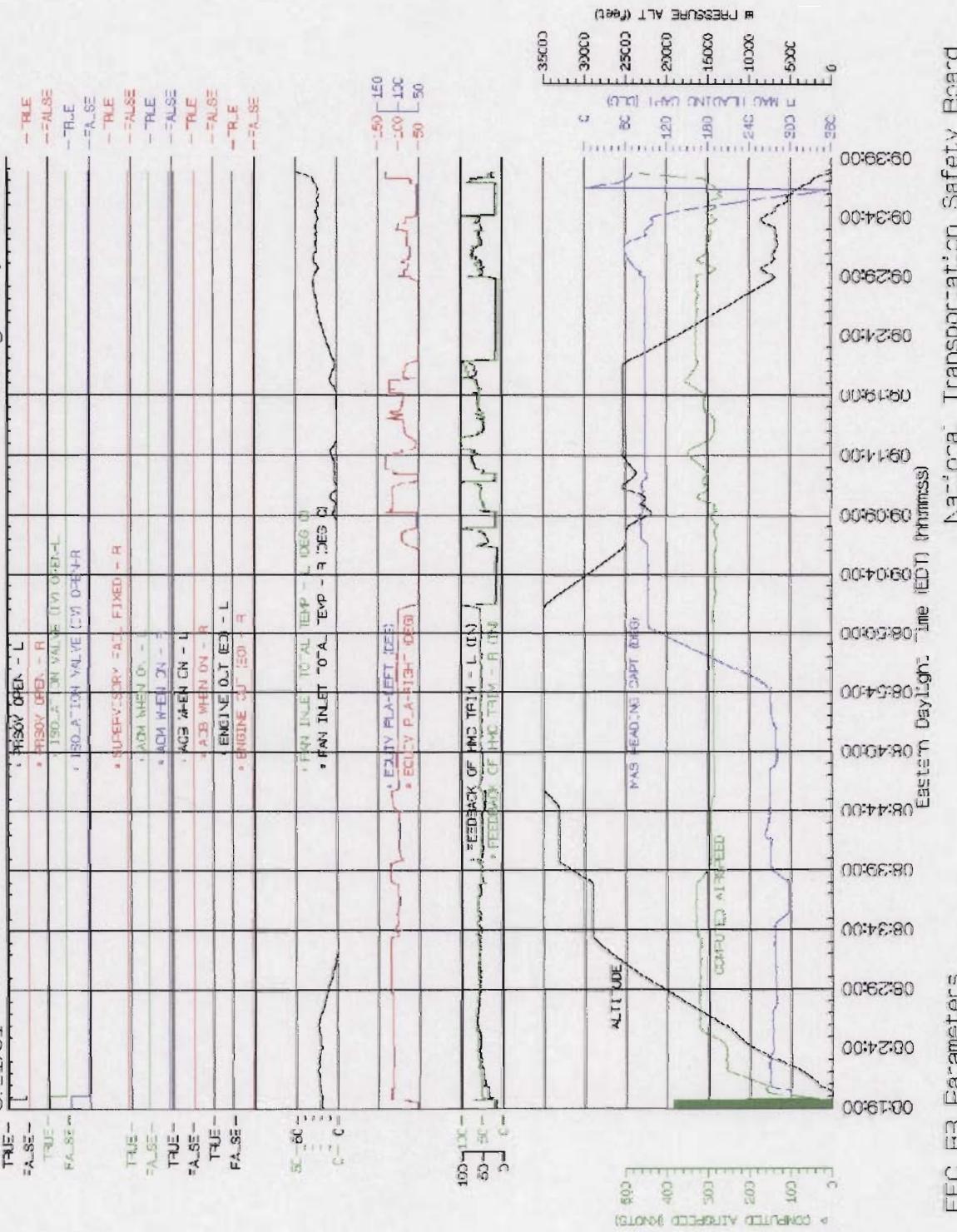


ADC end -CAS Parameters

Eastern Daylight Time (EDT) (hours)  
National Transportation Safety Board

# American Airlines Flight 77, Pentagon

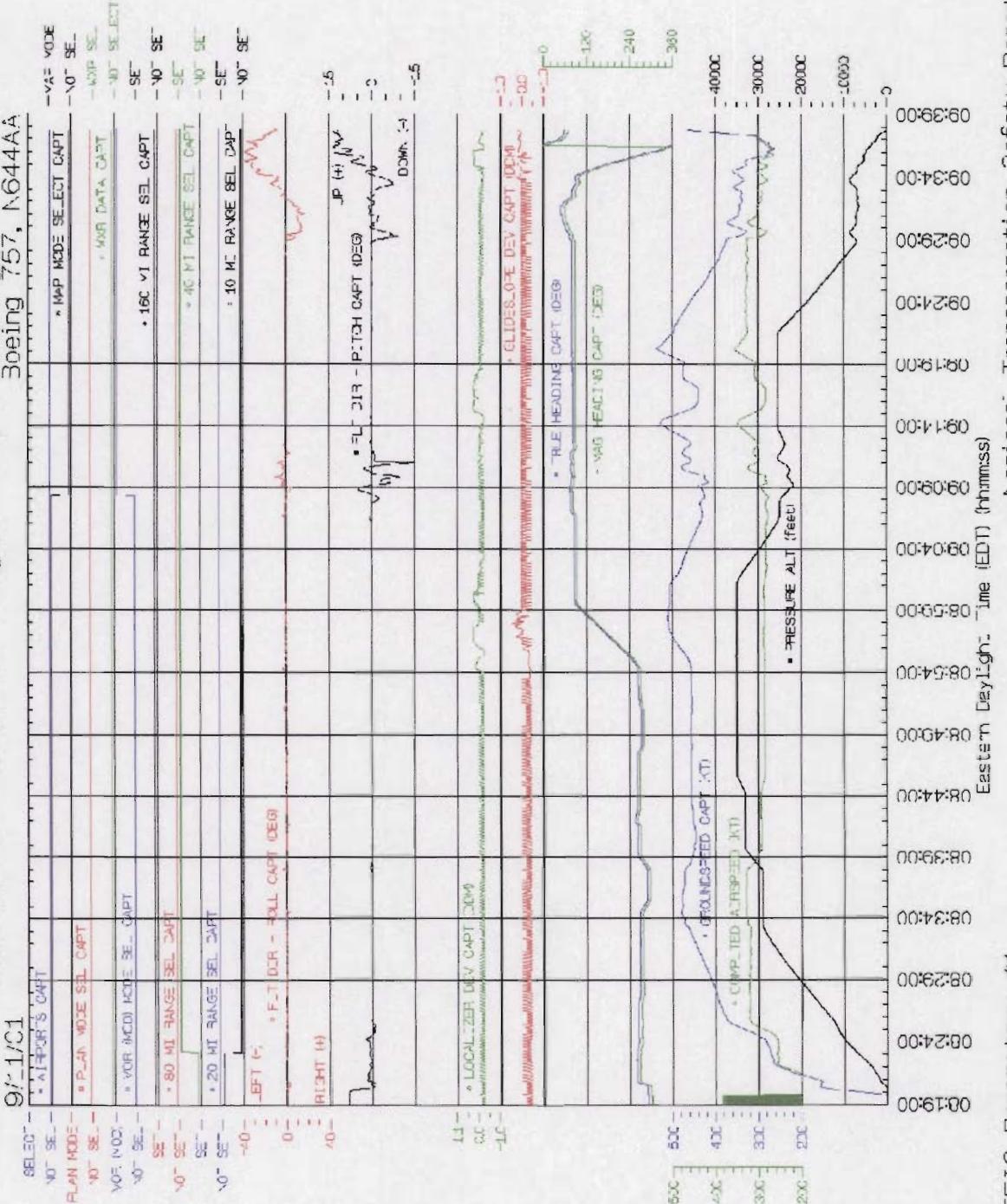
9/11/C1 Boeing 757, N644AA



EEC\_EE Parameters

National Transportation Safety Board

# American Airlines Flight 77, Pentagon

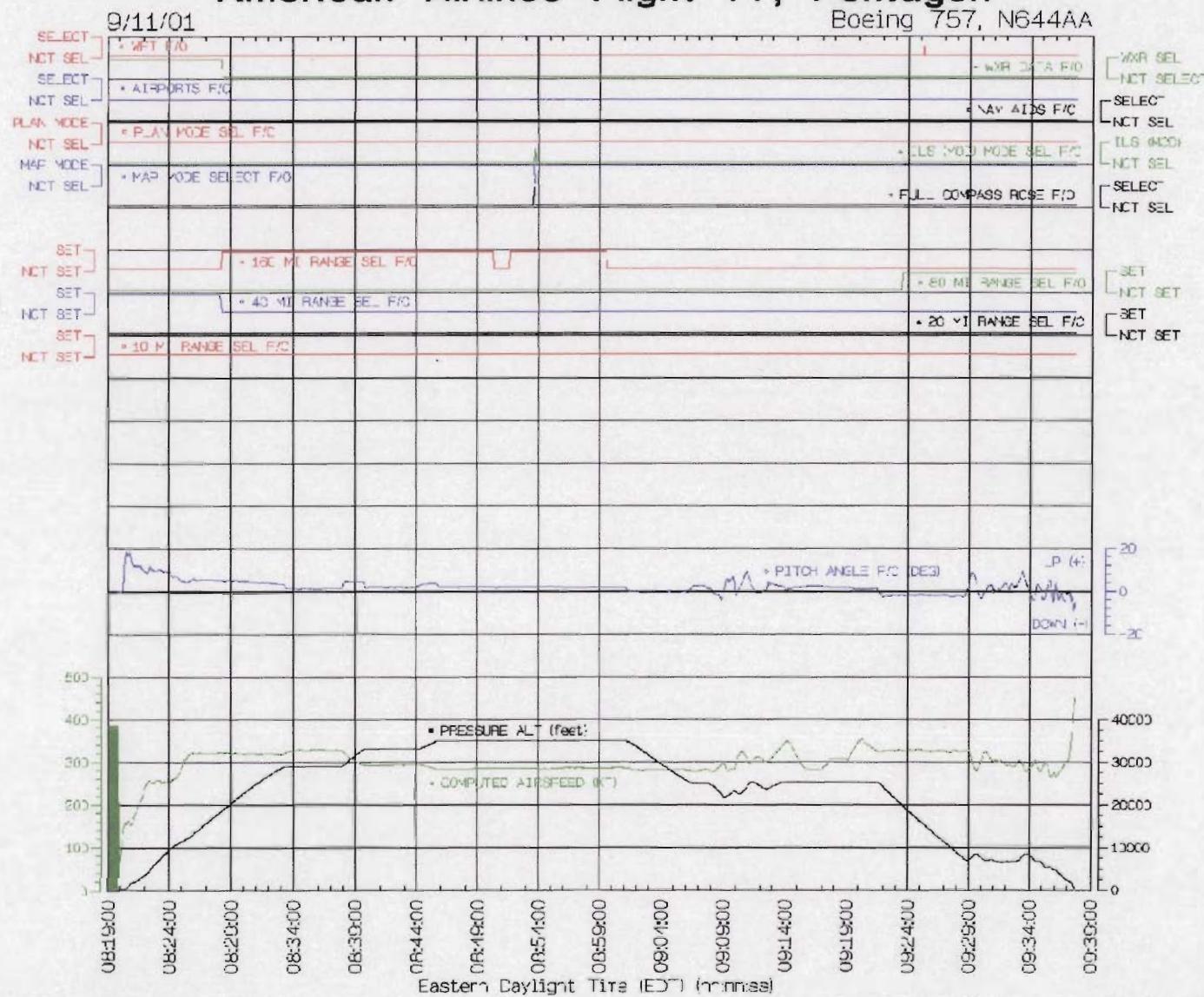


EFIS Parameters #1

National Transportation Safety Board

# American Airlines Flight 77, Pentagon

Boeing 757, N644AA



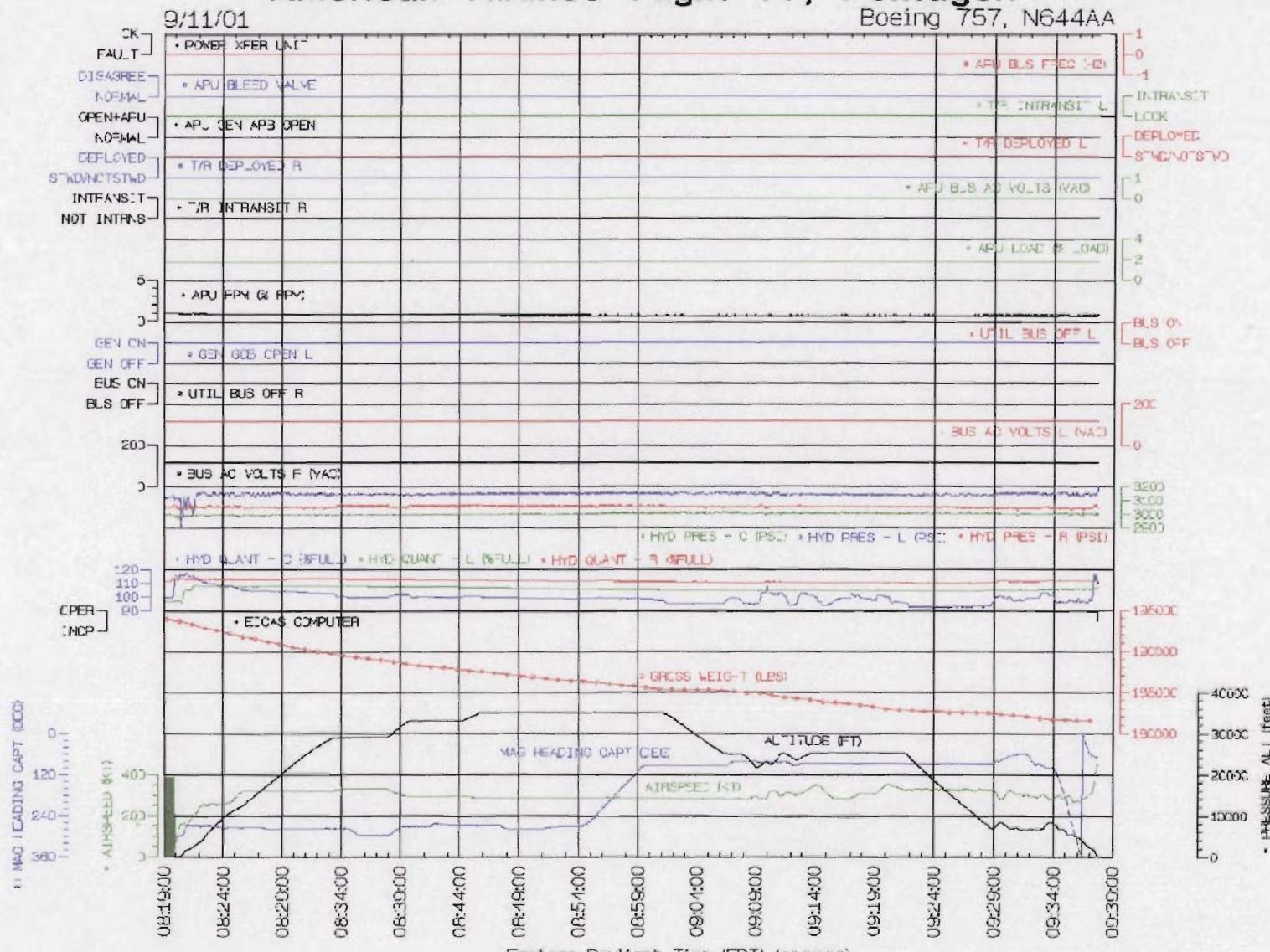
EFIS Parameters #2

National Transportation Safety Board

DCA01MA064

# American Airlines Flight 77, Pentagon

Boeing 757, N644AA

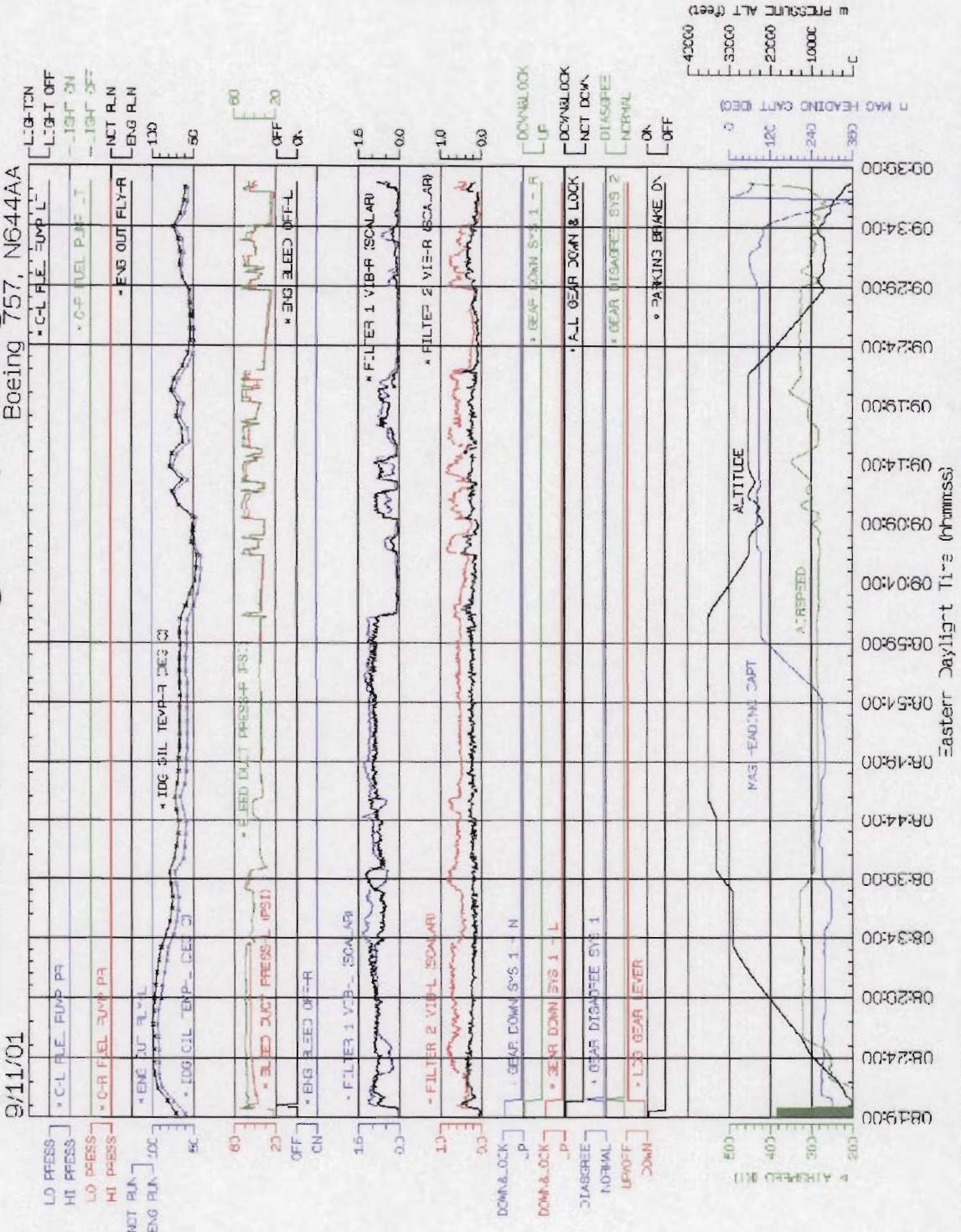


EICAS Parameters #1

National Transportation Safety Board

DCA01MA064

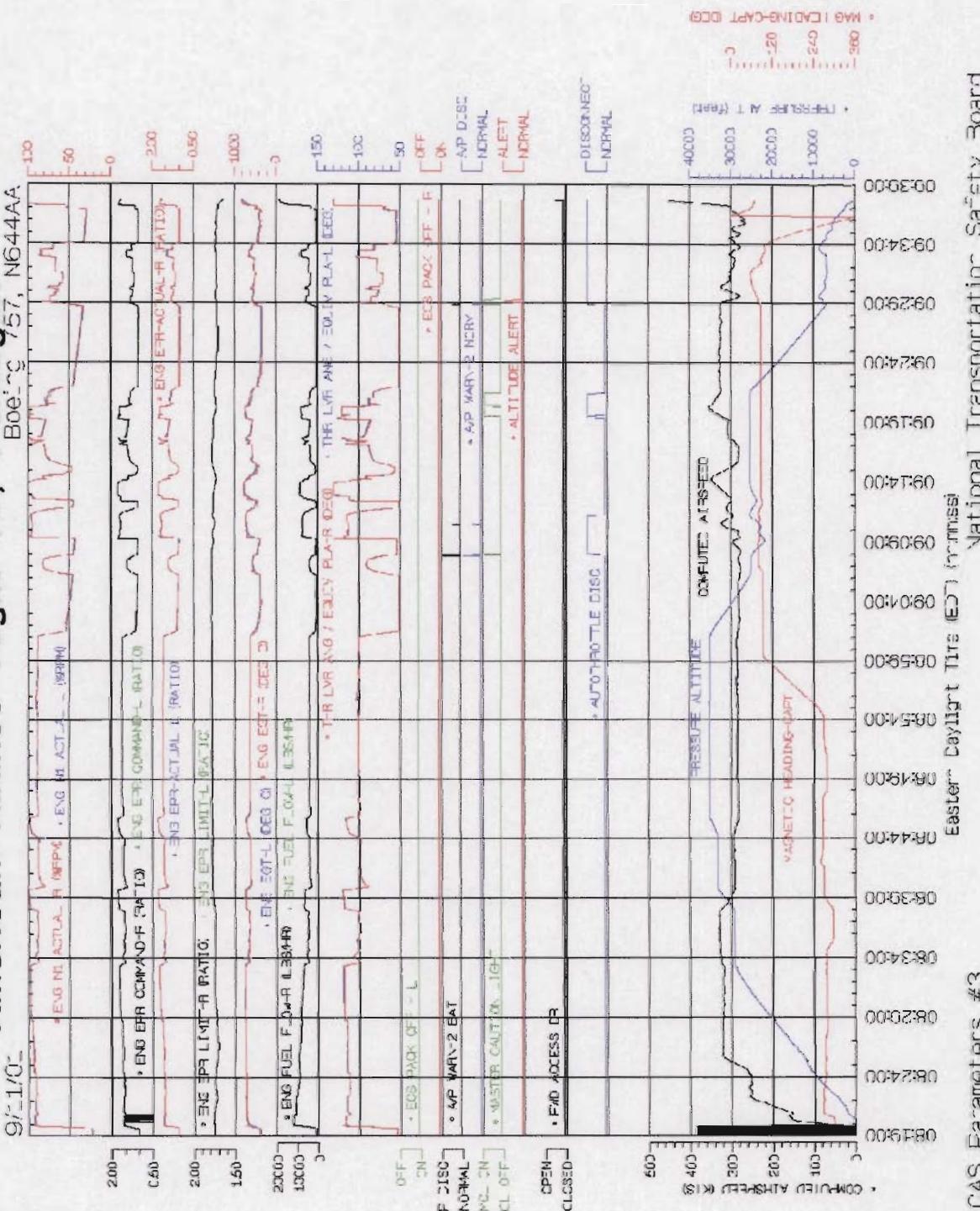
# American Airlines Flight 77, Pentagon



EICAS Parameters #2

National Transportation Safety Board

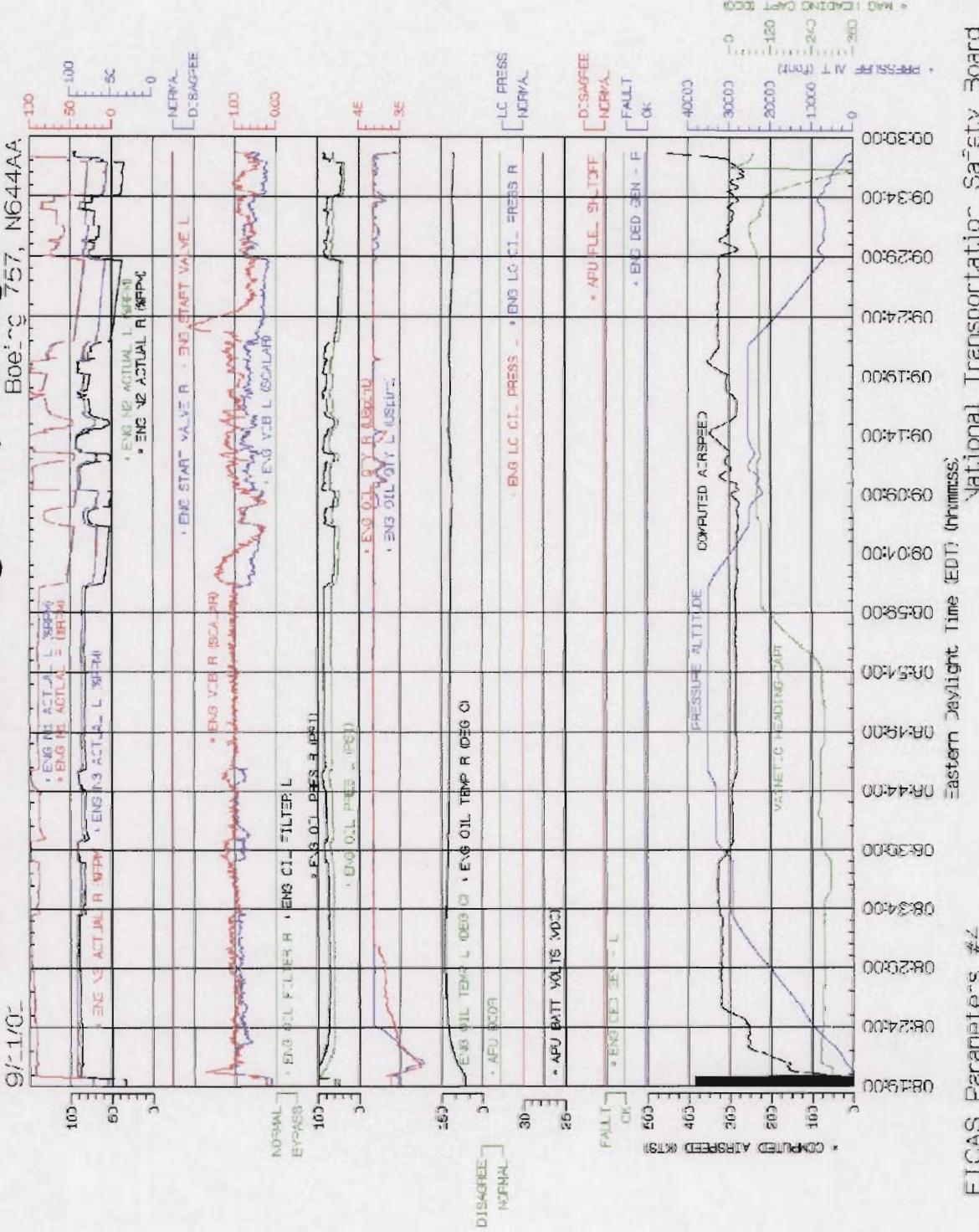
# American Airlines Flight 77, Pentagon



EICAS Parameters #3

National Transportation Safety Board

# American Airlines Flight 77, Pentagon

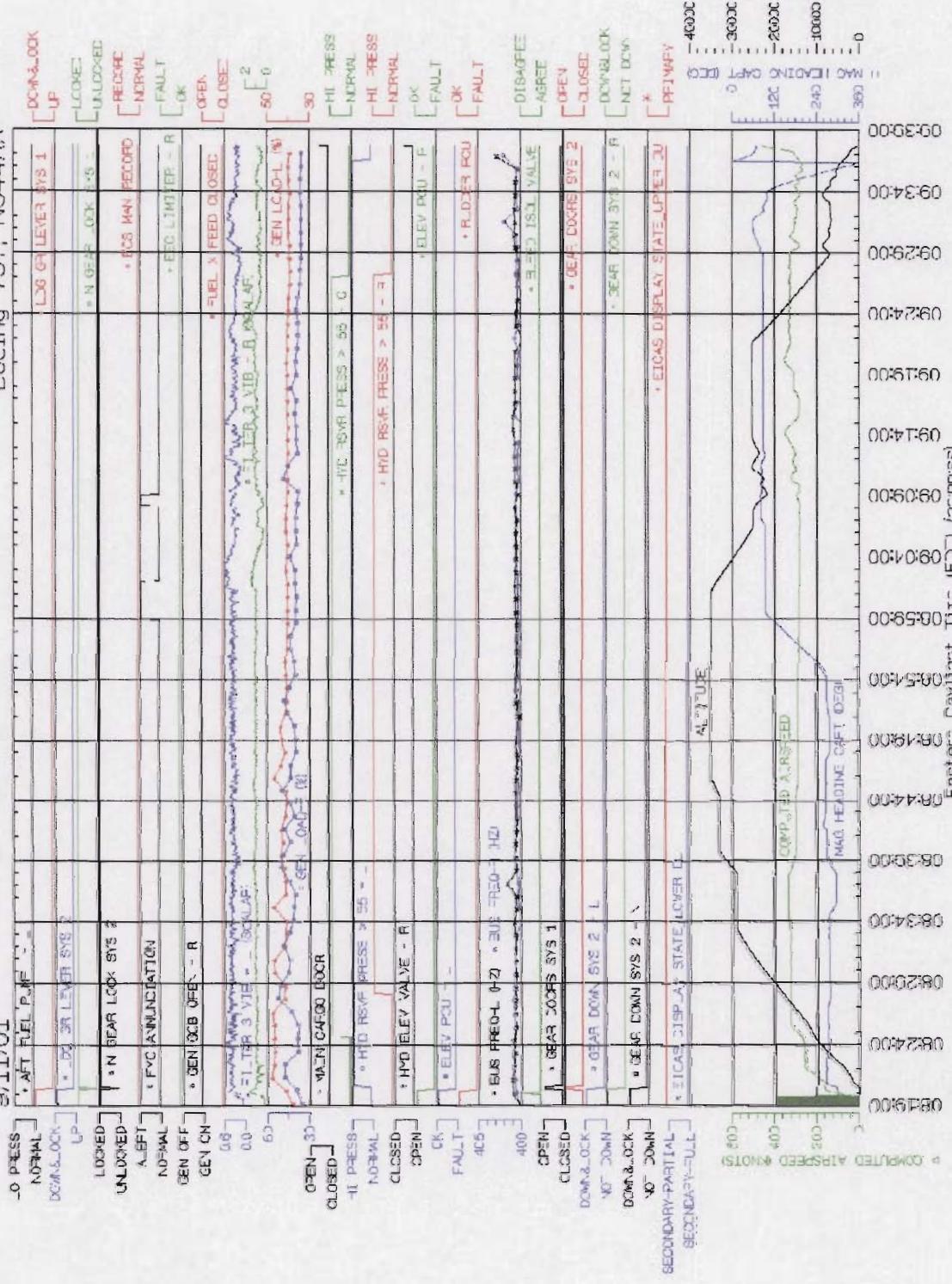


EICAS Parameters #2

National Transportation Safety Board

# American Airlines Flight 77, Pentagon

Boeing 757, N644AA  
09/11/01



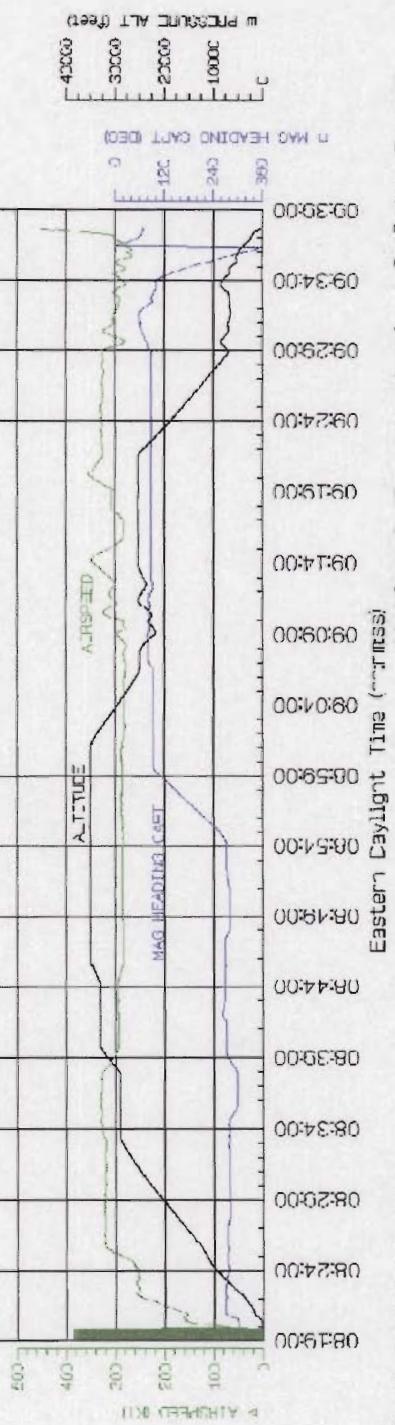
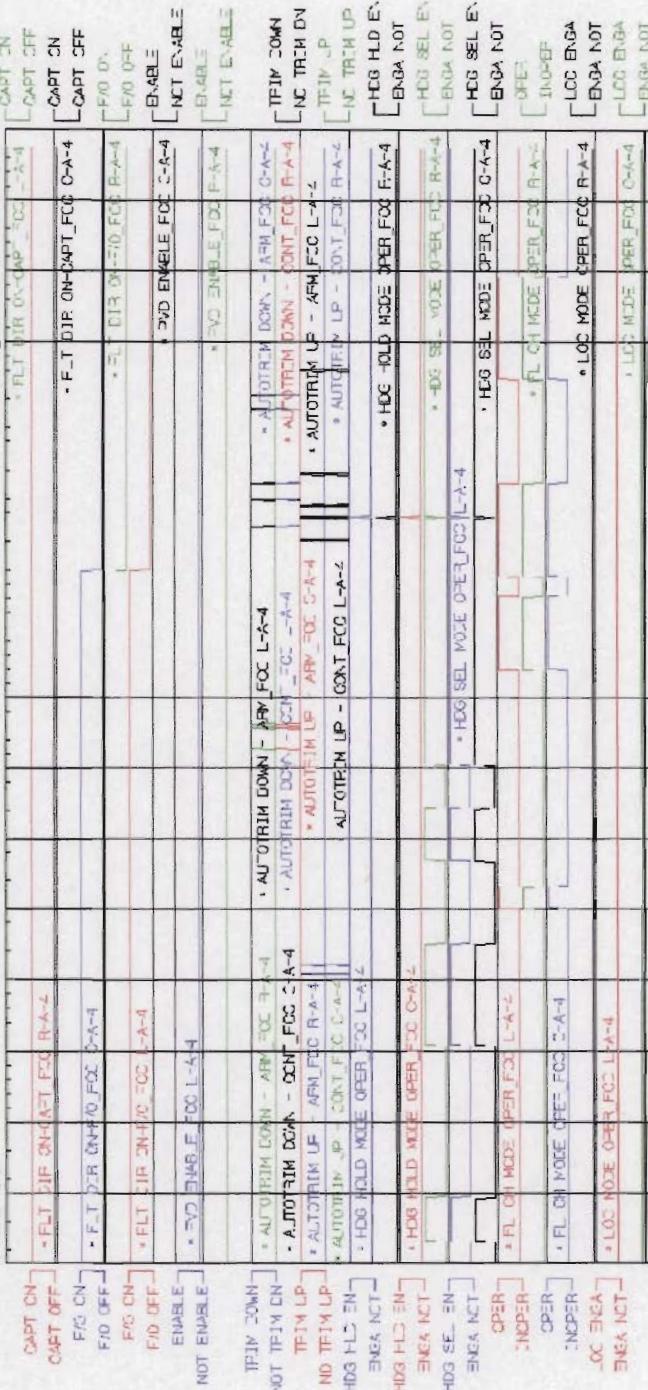
EICAS Parameters #5

National Transportation Safety Board

# American Airlines Flight 77, Pentagon

Boeing 757, N644AA

9/11/01



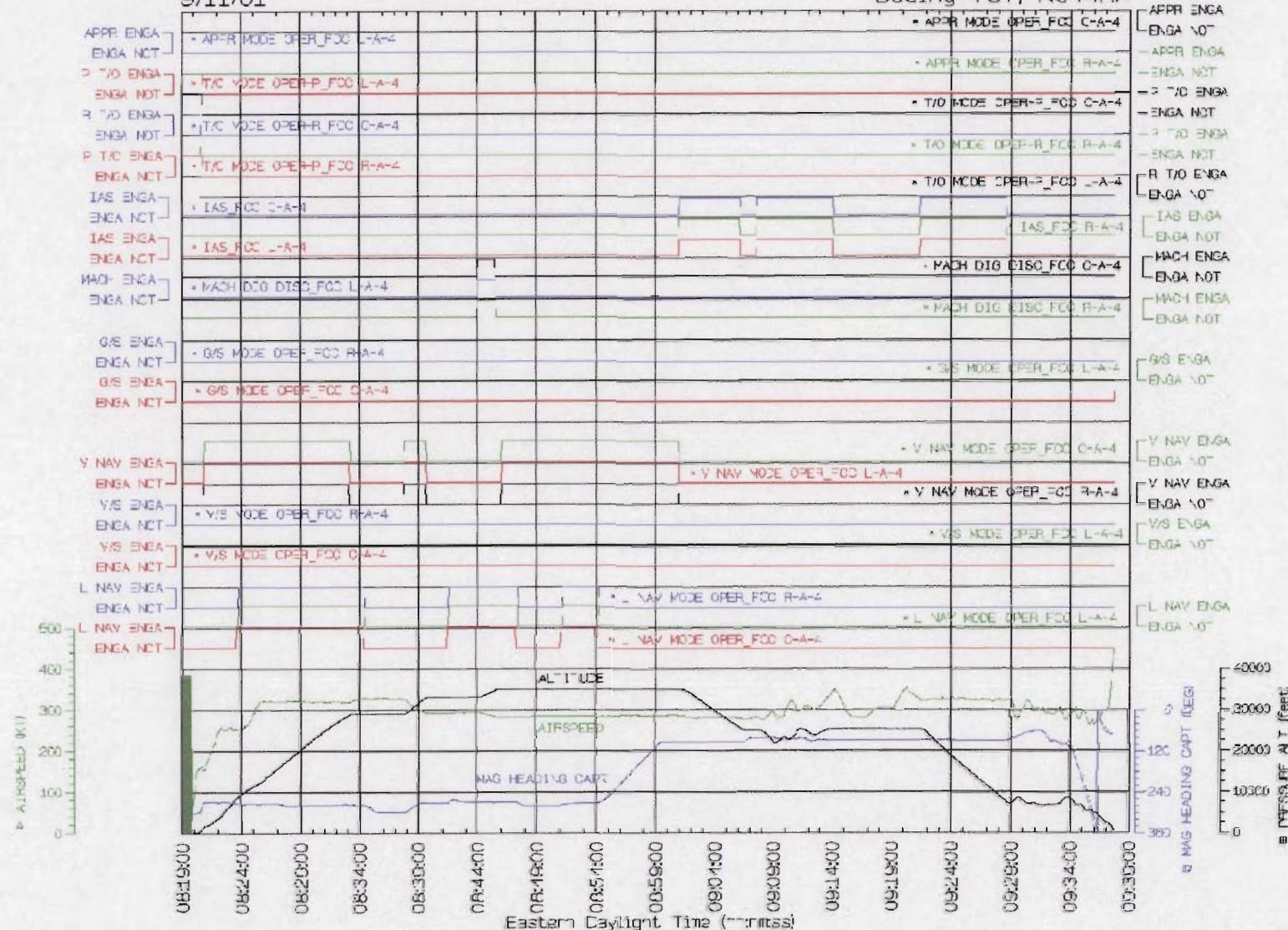
FCC Parameters #1

National Transportation Safety Board

# American Airlines Flight 77, Pentagon

9/11/01

Boeing 757, N644AA



FCC Parameters #2

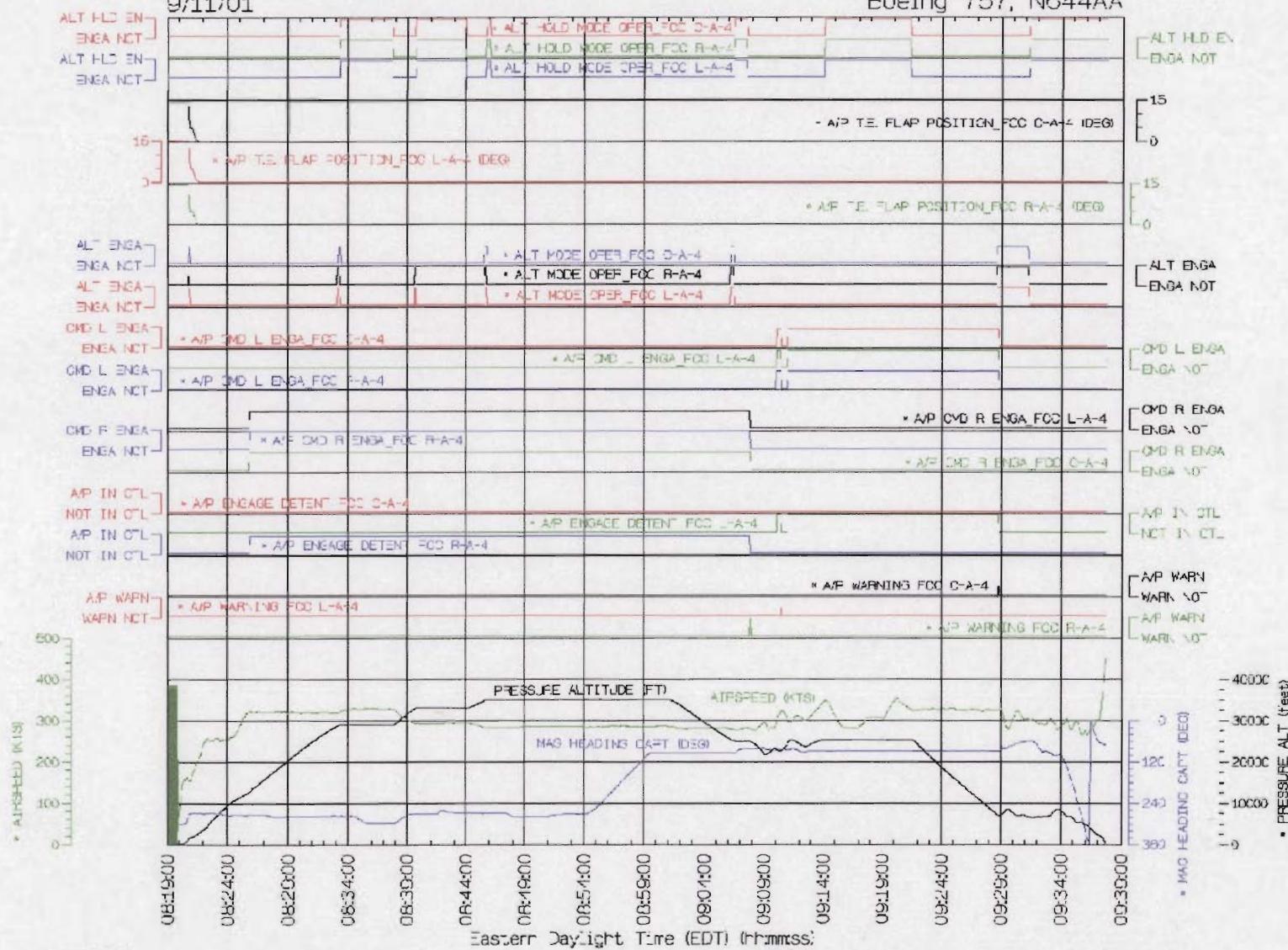
National Transportation Safety Board

DCA01MA064

# American Airlines Flight 77, Pentagon

9/11/01

Boeing 757, N644AA



FCC Parameters #3

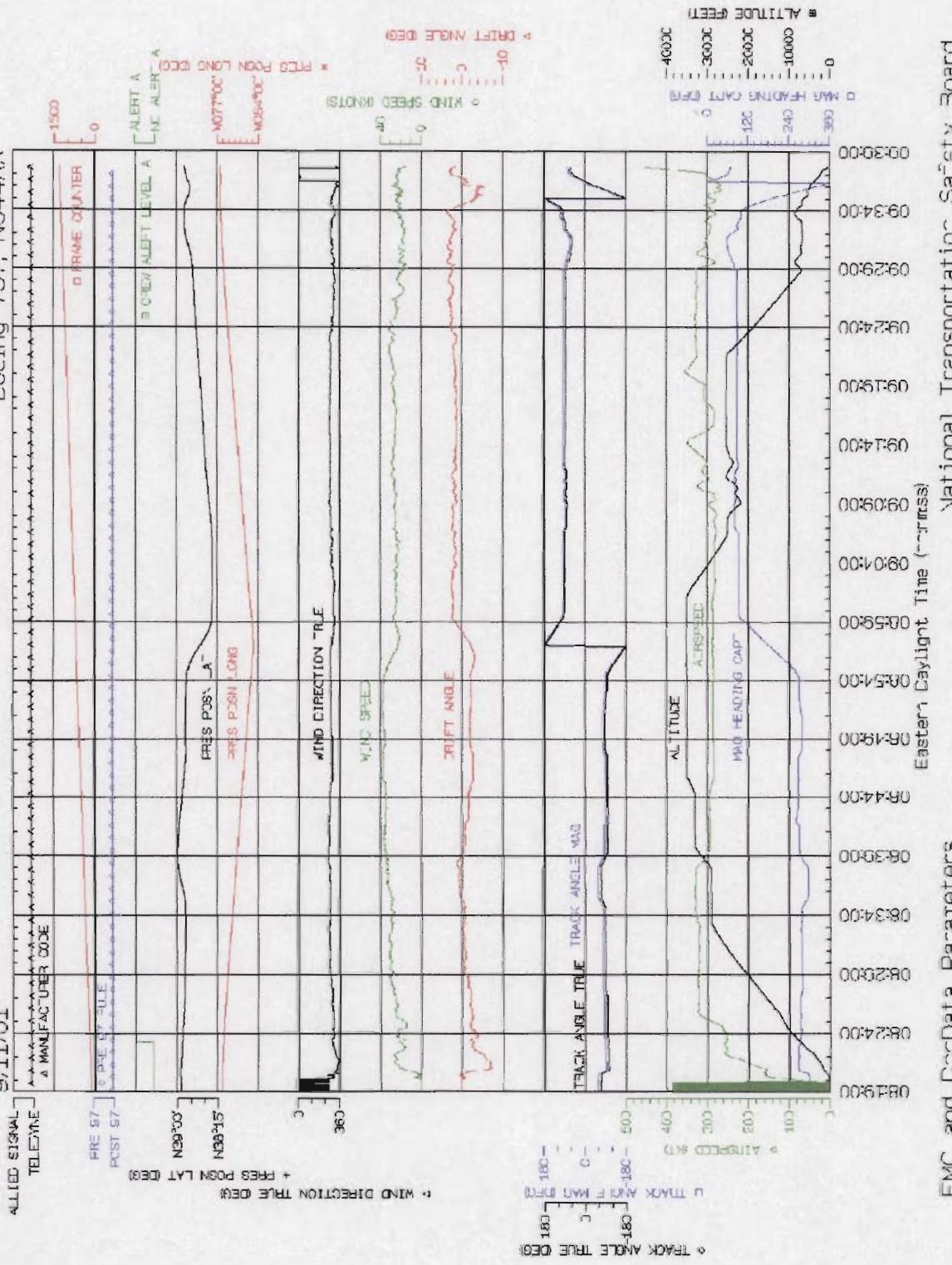
National Transportation Safety Board

DCA01MA064

# American Airlines Flight 77, Pentagon

Boeing 757, N644AA

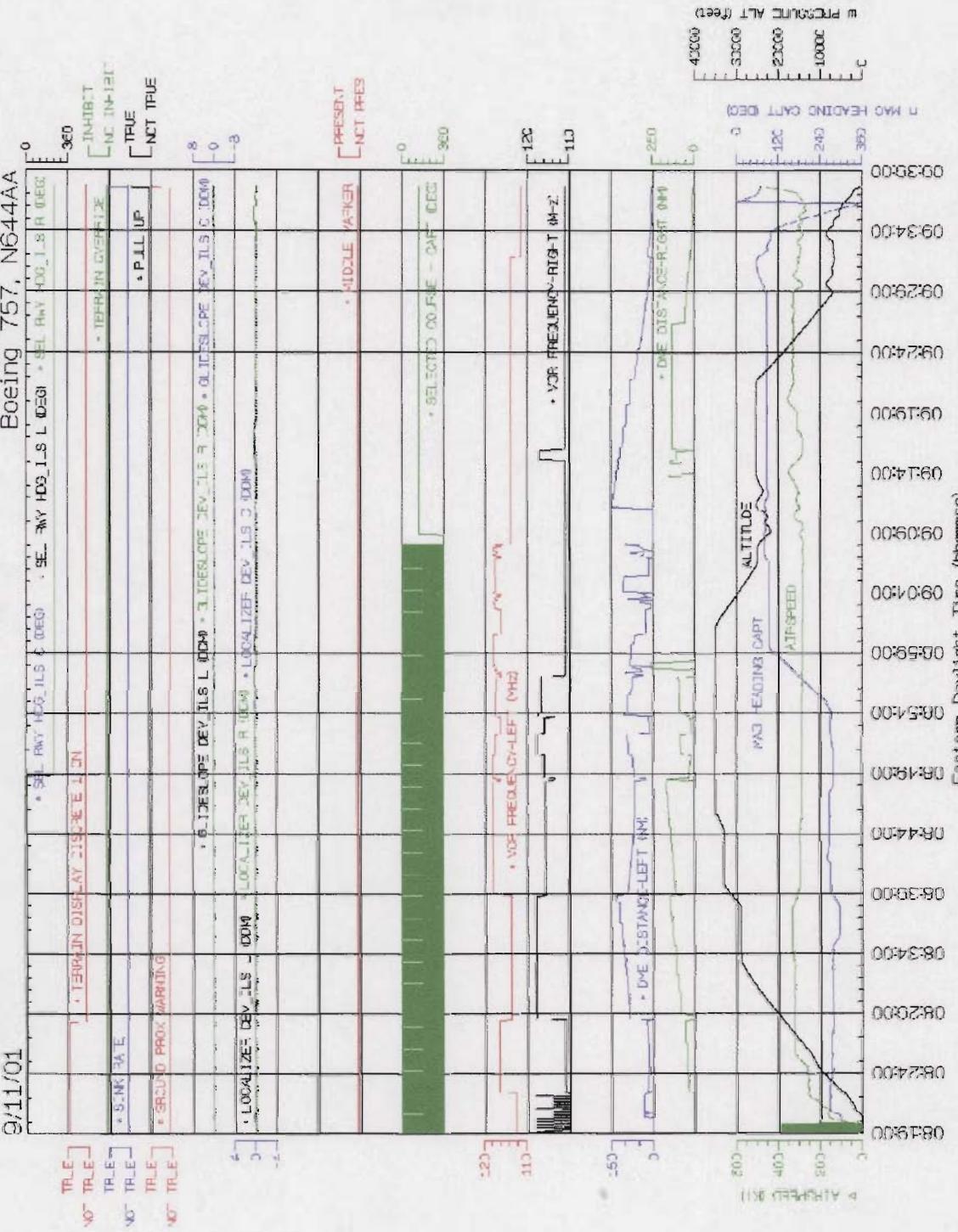
9/11/01



FMC and DocData Parameters

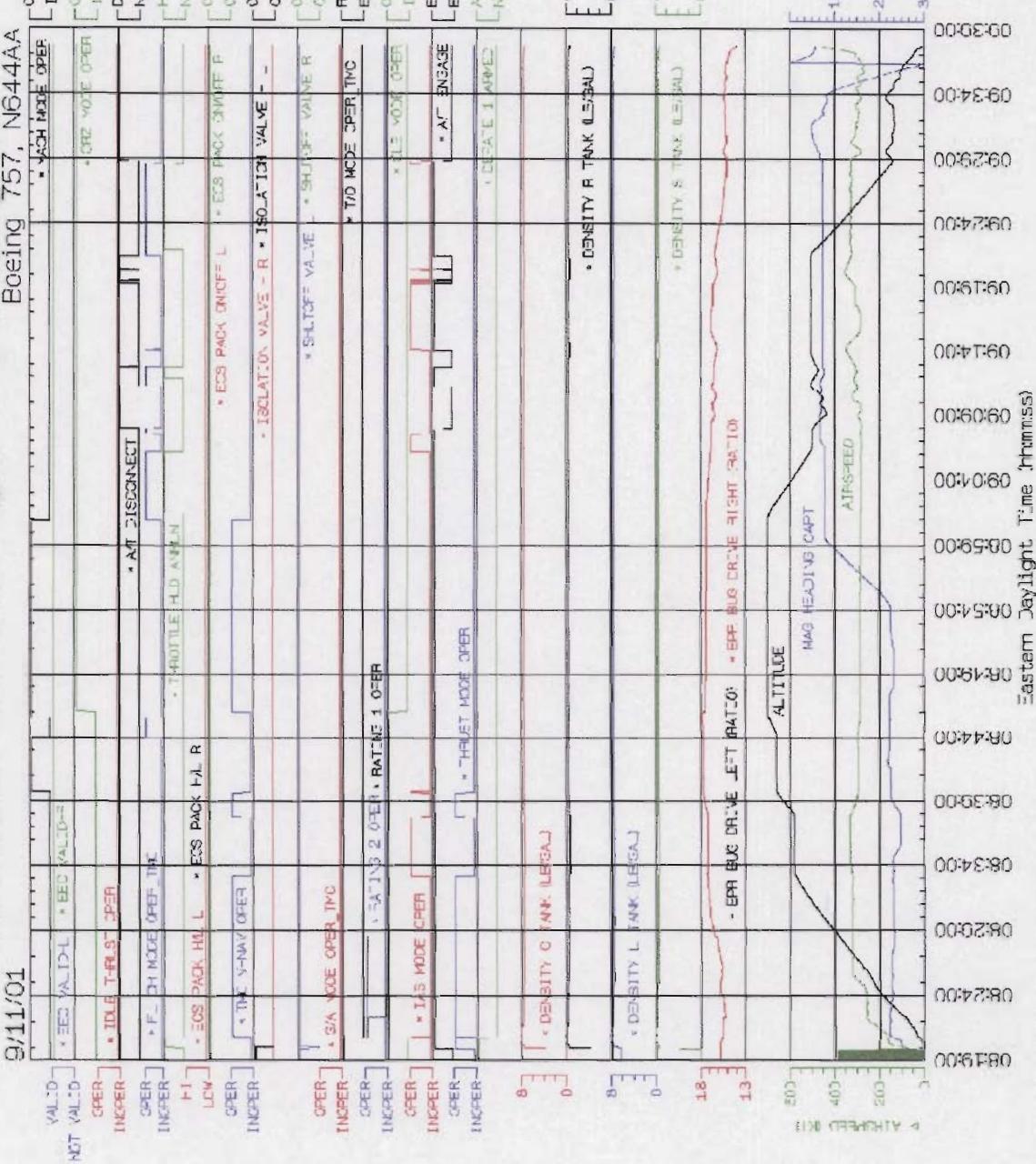
National Transportation Safety Board

# American Airlines Flight 77, Pentagon



ILS, GPS, VOR, and DME Parameters  
Eastern Daylight Time (EST)  
National Transportation Safety Board

# American Airlines Flight 77, Pentagon



-MC and FDRS Parameters

National Transportation Safety Board