

ARINC

FLIGHT MANAGEMENT COMPUTER SYSTEM

ARINC CHARACTERISTIC 702-6

PUBLISHED: JUNE 10, 1994

AN **ARINC** DOCUMENT

Prepared by
AIRLINES ELECTRONIC ENGINEERING COMMITTEE
Published by
AERONAUTICAL RADIO, INC.
2551 RIVA ROAD, ANNAPOLIS, MARYLAND 21401

Copyright© 1994 by
AERONAUTICAL RADIO, INC.
2551 Riva Road
Annapolis, Maryland 21401-7465 USA

ARINC CHARACTERISTIC 702-6©
FLIGHT MANAGEMENT COMPUTER SYSTEM

Published: June 10, 1994

Prepared by the Airlines Electronic Engineering Committee

Characteristic 702	Adopted by the Airlines Electronic Engineering Committee:	December 7, 1978
Characteristic 702	Adopted by the Industry:	February 28, 1979
Characteristic 702-1	Adopted by the Airlines Electronic Engineering Committee:	August 29, 1979
Characteristic 702-2	Adopted by the Airlines Electronic Engineering Committee:	March 12, 1981
Characteristic 702-3	Adopted by the Airlines Electronic Engineering Committee:	December 9, 1981
Characteristic 702-4	Adopted by the Airlines Electronic Engineering Committee:	October 25, 1989
Characteristic 702-5	Adopted by the Airlines Electronic Engineering Committee:	January 31, 1992

ARINC CHARACTERISTIC 702
TABLE OF CONTENTS

<u>ITEM</u>	<u>SUBJECT</u>	<u>PAGE</u>
1.0	<u>INTRODUCTION AND DESCRIPTION</u>	1
1.1	Purpose	1
1.2	Summary of Operational Characteristics	1
1.3	Brief Description of the System	1
1.4	Unit Description	2
1.4.1	Flight Management Computer (FMC) Unit	2
1.4.2	Control/Display Unit (CDU)	2
1.4.3	Flight Data Storage Unit (Optional)	2
1.5	Interchangeability	2
1.5.1	General	2
1.5.2	Interchangeability Desired for the ARINC 702 Flight Management Computer System	2
1.5.3	"Generation Interchangeability" Considerations	2
1.6	Integrity and Availability	2
1.7	Regulatory Approval	2
2.0	<u>INTERCHANGEABILITY STANDARDS</u>	3
2.1	Introduction	3
2.2	Form Factor, Connectors and Index Pin Coding	3
2.2.1	Flight Management Computer	3
2.2.2	Control/Display Unit (CDU)	3
2.2.3	Optional Flight Data Storage Unit (FDSU)	3
2.3	Interwiring	3
2.4	Power Circuitry	4
2.4.1	Primary Power Input	4
2.4.2	Power Control Circuitry	4
2.4.3	The Common Ground	4
2.4.4	The AC Common Cold	4
2.5	Environmental Conditions	4
2.5.1	Thermal Interface and Design	4
2.5.1.1	FMC	4
2.5.1.2	CDU	4
2.6	Weights	4
2.7	System Functions and Signal Characteristics	5
2.8	Grounding and Bonding	5
3.0	<u>SYSTEM DESIGN CONSIDERATIONS</u>	6
3.1	System Configurations	6
3.1.1	Single System Configuration	6
3.1.2	Single System/Dual CDU Configuration	6
3.1.3	Dual System Configuration	6
3.2	Basic System Functions	6
3.2.1	Performance Management	6
3.2.1.1	General	6
3.2.1.2	Performance Data Base	6
3.2.1.3	Optimum Flight Path	6
3.2.1.4	Performance Data Control and Display	7
3.2.2	Lateral Navigation and Guidance	7
3.2.2.1	Lateral Navigation	7
3.2.2.2	Lateral Guidance	7
3.2.3	Vertical Navigation and Guidance	7
3.2.3.1	Vertical Navigation	7
3.2.3.2	Vertical Guidance	7
3.2.4	Thrust Axis Control	7
3.2.5	4D Guidance (Growth Option)	7
3.2.6	Electronic Flight Instrument System Management	8
3.2.7	Data Update Interface	8
3.2.8	IRS Initialization and Heading Set	8
3.2.9	GNSS Initialization	8
3.3	Operational Features and Technical Considerations	8
3.3.1	Performance Management Computation	8

ARINC CHARACTERISTIC 702
TABLE OF CONTENTS

<u>ITEM</u>	<u>SUBJECT</u>	<u>PAGE</u>
3.3.1.1	General	8
3.3.1.2	Take Off Function	8
3.3.1.3	Altitude Intercept Distance and Time	8
3.3.1.4	Optimum Climb	8
3.3.1.5	Optimum Cruise Altitude	8
3.3.1.6	Maximum Range	8
3.3.1.7	Maximum Endurance	9
3.3.1.8	Fuel Remaining Over Destination	9
3.3.1.9	Top of Descent	9
3.3.1.10	Engine-Out Performance	9
3.3.1.11	Turbulent Air Performance	9
3.3.2	Flight Planning	9
3.3.3	Data Retrieval and Verification	9
3.3.4	Supplemental Navigation Information	9
3.3.5	Slant Range Correction	9
3.3.6	Automatic Station Selection and Tuning	9
3.3.7	"Direct To" Function	10
3.3.8	Detection of a Power Interrupt	10
3.3.9	Self Test	10
3.3.10	Immunity from Flight Path Perturbation	10
3.3.11	Manual Override Inputs	10
3.4	System Inputs	10
3.4.1	Management and Control (Pilot and Program Inputs)	10
3.4.1.1	System Initialization	10
3.4.1.2	Initial Data Inputs	11
3.4.1.2.1	Present Position	11
3.4.1.2.2	Gross Weight	11
3.4.1.2.3	Zero Fuel Weight	11
3.4.1.2.4	Outside Air Temperature	11
3.4.1.2.5	Airport Elevation	11
3.4.1.2.6	Cost Index	11
3.4.1.2.7	Greenwich Mean Time	11
3.4.1.3	Waypoint Definition	11
3.4.1.3.1	Waypoint Identifier	11
3.4.1.3.2	Waypoint Latitude and Longitude	11
3.4.1.3.3	Waypoint Reference Fix	11
3.4.1.3.4	Waypoint Bearing from Station (Theta)	11
3.4.1.3.5	Waypoint Distance from Station (Rho)	11
3.4.1.4	Navaid Definition	11
3.4.1.4.1	Station Identifier	11
3.4.1.4.2	Station Frequency	11
3.4.1.4.3	Station Elevation	11
3.4.1.4.4	Station Declination	11
3.4.1.4.5	Station Latitude and Longitude	12
3.4.1.5	Cross Track Offset Distance	12
3.4.1.6	Along Track Offset Distance	12
3.4.1.7	Assigned Time at a Fix	12
3.4.1.8	Manual Override Inputs	12
3.4.2	Sensor Inputs	12
3.4.3	Sensor Warning Inputs	12
3.5	System Outputs	12
3.5.1	System Integrity Monitoring and Failure Warning Outputs	12
3.5.2	System Control Signals	12
3.6	Growth Features	12
3.7	Sensor Failures	13
3.8	FMC Equipment Accuracy	13
3.9	System Status Alert	13
4.0	<u>STANDARD SIGNAL CHARACTERISTICS</u>	14
4.1	General Accuracy and Operating Ranges	14
4.1.1	Resolution	14

ARINC CHARACTERISTIC 702
TABLE OF CONTENTS

<u>ITEM</u>	<u>SUBJECT</u>	<u>PAGE</u>
4.1.2	Standardized Signals	14
4.1.2.1	Digital Data Standards	14
4.1.2.2	Standard "Applied Voltage"	14
4.1.2.3	"Standard Ground" Signal	14
4.1.2.4	"Standard Open" Signal	14
4.2	Data Signals	14
4.2.1	FMC Digital Data Inputs	14
4.2.1.1	VOR Input Ports	14
4.2.1.2	DME Input Ports	14
4.2.1.3	ILS Input Port	14
4.2.1.4	Air Data Input Ports	14
4.2.1.5	IRS/AHRS Input Ports	14
4.2.1.6	Flight Control System Input Ports	15
4.2.1.7	Control Display Unit Input Ports	15
4.2.1.8	Data Update Input Ports	15
4.2.1.9	Intersystem Data Input Ports	15
4.2.1.10	Propulsion/Configuration Data Input Ports	15
4.2.1.11	Electronic Flight Instrument System Input Ports	15
4.2.1.12	Digital Clock Input	15
4.2.1.13	Reserved Ports for Growth Inputs	15
4.2.1.14	GPS Input Ports	15
4.2.2	FMC Digital Data Outputs	15
4.2.2.1	FMC Intersystem Output	15
4.2.2.2	General Data Output #1	15
4.2.2.3	General Data Output #2	15
4.2.2.4	Instrument Data Output	16
4.2.2.5	CDU Output Port "A"	16
4.2.2.6	CDU Output Port "B"	16
4.2.2.7	Data Loader Output	16
4.2.2.8	Data Link Output	16
4.2.3	CDU Digital Data Inputs	16
4.2.4	CMU Digital Data Outputs	16
4.3	Control Signals	16
4.3.1	Digital Control Inputs	16
4.3.2	Discrete Inputs and Outputs	16
4.3.2.1	Specifically Assigned FMC Discrete Inputs	16
4.3.2.1.1	Off-side CDU Enable	16
4.3.2.1.2	Autotone Master/Slave Discrete	16
4.3.2.1.3	Oleo Strut Switch	16
4.3.2.1.4	Maintenance Test Discrete	16
4.3.2.1.5	Manual/Audio Discretes	16
4.3.2.1.6	MAG/True Input Discrete No. 1	16
4.3.2.1.7	Source/Destination Identifier	17
4.3.2.1.8	Navigation Data Base Update Enable	17
4.3.2.1.9	Operating Program Update Enable	17
4.3.2.1.10	Performance Data Base Update Enable	17
4.3.2.2	Reserved FMC Discrete Inputs for Future Specific Assignments	17
4.3.2.3	Reserved FMC Discrete Inputs for Application-Unique Functions	17
4.3.2.4	FMC Discrete Outputs	17
4.3.2.4.1	CDU Message Alert Discrete	17
4.3.2.5	CDU Discretes	17
4.3.2.5.1	CDU Active Input Identification Discrete	17
4.3.2.5.2	CDU Primary/Secondary Status Input Discrete	17
4.3.3	Digital Control Outputs	17
4.3.4	FMC "Data Loader Connected" Function	17
4.4	FMC/FMC Intersystem Communications	17
4.5	FMC/ACARS Interface	17
5.0	<u>CONTROL DISPLAY UNIT (CDU) DESIGN</u>	18
5.1	General	18
5.2	Form Factor	18

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.