



FUTURE-PROOF TABLET BASED ELECTRONIC FLIGHT BAG SOLUTION

- Flexible, modular and future-proof onboard infrastructure
- Tablet device independent – MS Windows / iOS
- Wide range of dockable cradles
- Optional Camera systems, CDSS & CCSS,
Cockpit Door- and Cargo Compartment Surveillance System





MODERN TODAY – READY FOR TOMORROW

The modular tablet based Electronic Flight Bag (EFB) concept from ScandinavianAvionics (SA) is a state-of-the-art future proof solution. The system provides the functionality to meet today's operational requirements of airlines and aircraft operators, and at the same time is simple to upgrade in the future, to meet new requirements and needs.

The flexible infrastructure of the EFB concept means that basically any current and future tablet, easily can be certified for installation in the aircraft. This enables the airline or aircraft operator to upgrade the tablets concurrently with the rapid development of consumer tablets and their functionality, making the SA EFB solution truly future-proof.

THE CONCEPT

The SA EFB solution is a modular, tablet based EFB concept:

WINDOWS OR IOS TABLETS

Installed in the cockpit to provide the pilots with all possible required information in the best quality available. Currently SA supply cradles for Panasonic FZ-G1, Surface Pro, Lenovo ThinkPad and iPad. The mount design allows for easy upgrades when new tablets are available – without tools with the QuickLock™ feature – just replace the display cradle and associated cable.

DIC-600 – DATA INTEGRATION CENTER

The Data Integration Center core functionality provides Aircraft Interface (A429, A717/573) Tablet Power supply, Network Server Capability and a Gigabit Ethernet Switch.

CONTROL PANEL

The Control Panels provide an avionics grade installation enabling Power supply to EFB devices and wired or wireless communication interface. All Control Panels come with the auxiliary USB 2A Power outlet designated for PED (Personal Electronic Device) charging.

CWAP – COCKPIT WIRELESS ACCESS POINT

The Cockpit Wireless Access Point (CWAP) enables swift and easy access to a currently installed onboard EFB network but as well serves as the aircraft connection point for on board data buses in new installations.

CDSS

– COCKPIT DOOR SURVEILLANCE SYSTEM

A network based Surveillance Camera System comprising of cameras utilizing a Central Switch Unit. The central switch unit (CSU) provides Ethernet switching capability and power for the camera system and can host up to four Camera heads. Viewing of Cockpit Door and Cabin are performed from the EFB device, either integrated in the EFB software platform or a standalone SA Software.

ERC-400 – ETHERNET RADIO CONTROLLER

The Ethernet Radio Controller is a communication unit that enables and controls the data communication between the EFB system and the ground infrastructure of the airline.

The unit is designed with a USB port for attachment of a 3G/4G/LTE/WiMAX network USB dongle. This enables the airline, at low certification costs, to upgrade network connectivity concurrently with the development of communication technologies simply by switching the USB dongle.

DIC-600 – EFB REDEFINED

Rapid evolution from component based, purposely built EFB equipment, to tablet based designs requires a focal shift in architecture design. From being cockpit centric the requirement is now focused towards a network centric, flexible and adaptable architecture. To be in pace with the technology evolution The SA Group introduces the centerpiece for future Electronic Flight Bag architectures, the Data Integration Center (DIC). DIC-600 (Data Integration Center) provides the central function required for today's and future EFB Platforms. Aircraft integration, communication and on-board processing are a prerequisite to reach the level of operational efficiency required with the available technology of today.

The DIC-600 provides generic and standardized interfaces to on-board systems as well as for EFB cockpit systems of any brand or technology. The developed drop-in architecture provides effortless integration into currently deployed technology. Gigabit networking and advanced network management functions ensures enough capabilities to host data intensive remote display functionality without jeopardizing network performance as well as hosting external functionality in an efficient way. The DIC-600, a.o. gives you:

- Access to avionics data and signals in realtime to support charting or data driven software applications such as quick access data or techlogs
- Utilize the built in server capability to access documentation updates, send reports and quickly finish your performance calculations independently if the end device is an iPad™ or a Windows based system.
- Utilize the built in- or external SatCom capability to send in-route reports or download in-flight required data.
- Utilize the shared resources on the Gigabit network using VLAN domain separation to ensure highest possible security and data availability.

CORE FUNCTIONS

Aircraft Interface Module (AIM)

- Provides a safe and high performance avionics interface to RX Arinc 429 and TX A429 buses
- Provides access to A717/591 (QAR/DAR) bus for utilization of QAR / DAR datastreams
- Provides access to discrete inputs for event triggering such as OOOI.

Network Server Module (NSE)

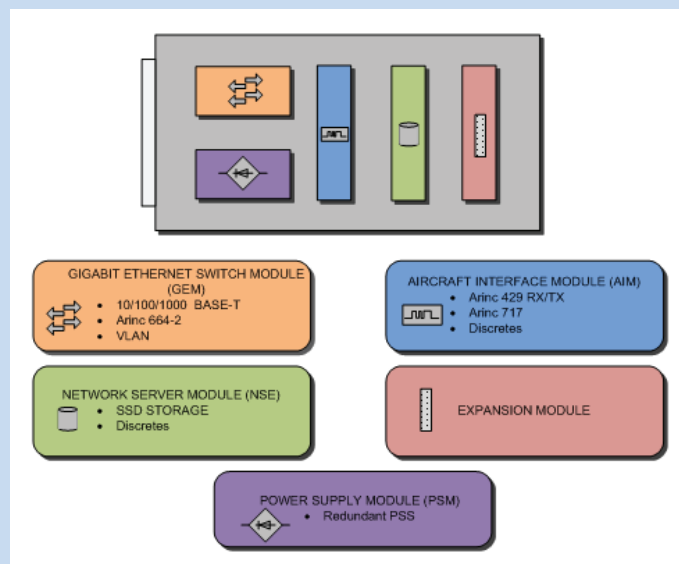
- Provides redundant storage for staging of Software updates, recovery images and repository for maintenance documentation
- Provides access to Avionics data for customized processing and automation
- Provides centralized INTEL I3™ processing capability for remote units (tablets or iPads™) without enough processing power to perform such tasks.

Gigabit Ethernet Switch Module (GEM)

- Provides a managed network environment with future proof Gigabit performance
- Provides network interfaces for Ethernet based accessories such as Laptop Docking stations or Communication devices.
- VLAN capability ensures domain separation and QoS to support remote display application without network congestions.

Power Supply Module (PSM)

- Provides redundant regulated power and charging capabilities to cockpit mounted tablets or iPads™



DIC-600 – TECHNICAL DATA

QUALITY

Scandinavian Avionics (The SA Group) is continually and proactively working with quality assurance to ensure The SA Group currently holds the following approvals that ensures the highest product standards:

- EASA Part 21J
- EASA Part 21G
- EASA Part 145
- FAA 145
- EASA Part 147

Cloud Tools

- Built in hardware capabilities the device can host Cloud services such as Component Health Monitoring (CHM), which monitor the software status and health of each component in the EFB network.
- To ensure proper configuration control, the Cloud tool ACM (Aircraft Configuration Monitoring) can be utilized by the EFB administrator to monitor on-board equipment, serial numbers, scheduled maintenance in real-time.

INTERFACES

Aircraft Interface Module (AIM)

- Up to 12 Arinc 429 RX Ports
- Up to 4 Arinc 429 TX/RX Pairs
- One Arinc 717 or 591 Port (selectable)
- Eight Discrete inputs (OPEN / GND)
- Two Discrete outputs (OPEN / GND)
- Two A/D Channels (0-28V)
- One RS-232 Channel

Gigabit Ethernet Switch Module (GEM)

- Up to 6 Ethernet interfaces
- Three Gigabit 1000 BaseT
- Three 100 BaseT
- VLAN Segregation
- QoS
- Cable Diagnostics
- Layer 2 Switching

Network Server Module (NSE)

- Processor: Intel® Core™ i3-3217UE 2x1.6GHz
- Chipset: Intel® Mobile QM77
- Storage: 128 GB solid state
- RAM: 8 GB DDR3-1600 SO-DIMM, Dual Channel
- Operating System: Windows® 7, Optional: Linux, VxWorks

Power Supply Module (PSM)

- Dual power input
- Redundant Power Feed with automatic switchover
- Dual Conditioned output [5-20V / 80W]
- Single 28VDC Output [21W]

The Scandinavian Avionics EFB solution gives us the capabilities we require of an EFB system today and the flexibility of updating in the future to a top-notch [display] independent of the EFB architecture...

Ole-Christian Melhus, Deputy Director Flight Operations,
Norwegian Air Shuttle



COCKPIT WIRELESS ACCESS POINT – CWAP

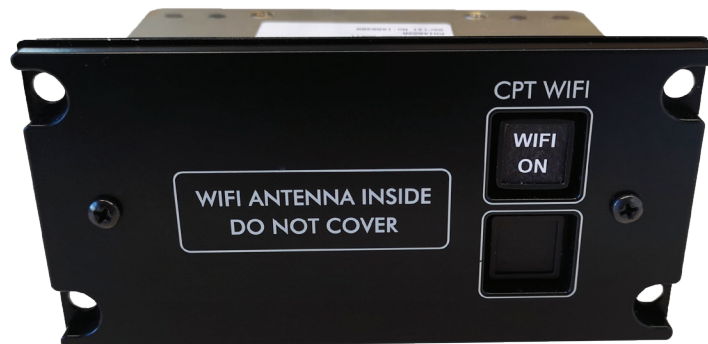
The requirement for operators flexibility in the cockpit has emerged both as a cost saver as well as a requirement to be in pace in the evolution of Electronic Flight Bag (EFB) Tablets. So far legacy wired solutions for charging and data have been utilized. With increased operating times for battery powered devices the charging requirements are reduced for many airlines. Elimination of charging will also implicate eliminating the wired connection to the Electronic Flight Bag device and thus the possibility of utilizing aircraft data.

The Cockpit Wireless Access Point (CWAP) enables swift and easy access to a currently installed onboard EFB network but as well serves as the aircraft connection point for on board data buses in new installations. This concentration of function reduces the need of a separate Aircraft Interface Device and significantly reduces weight and complexity of the installation. Integration CWAP in the

cockpit is made in the overhead panel or center pedestal with a real OEM look and feel. The single Electronic Flight Bag interface point utilizes ARINC standard protocols to serve the current as well as future Electronic Flight Bag devices without changing the installed provisions in the aircraft – a future proof solution for real.

Maintaining and cross checking of data is made easy through the wireless crosslink capability. Built-in shared in-aircraft storage can be used to host aircraft persistent data such as e-tech logs and maintenance records swiftly accessible to onboard crew or maintenance personnel.

This is an extension of Scandinavian Avionics path for a true future proof solution for the modern airline – as a new component or as a complement to currently installed systems, independently of make or model.



SPECIFICATIONS P/N 70-12008-[]

Functional Interface

- WiFi 802.11b/g/n
- Ethernet 100BaseT
- Dimming bus

Software:

- A834 STAP

Optional:

- 64Gb FLASH Storage

Physical Interface

- Weight 0.3kg
- Size (WxHxD)
146x88x107mm
(acc MS-25212)

Mounting

- Locking DZUZ (acc. MIL-F-25173)

Electrical Interface

- DC Input 12-32V (28V nom.)
- Max Current: 0.5A
- 4x A429RX (Base model 2x)
- 2x A429RX (Base model 1x)
- 1x A717/571 (Optional)
- 6x Discrete (ADB -100, OPEN / GND, Base model 2x)
- 2x 100BaseT

TABLET CONTROL PANEL

Rapid evolution from component based, purposely built EFB equipment, to emerging tablet based solutions, require new versatile and generic components. New technologies must be supported by installed infrastructure now as in the future situation of required upgrades. To be in pace with the technology evolution The SA Group has developed tailored and versatile functions to support new tablet based Electronic Flight Bag systems.

The Tablet Control Panel provides an avionics style implementation with the same look and feel as onboard OEM equipment and it supports Commercial Off The Shelf Tablets of any kind. Easy mounting and maintenance through standard DZUS size form factors enables effortless maintenance and a single box installation that eliminates additional cost driving provisions such as DC-converters, Kill switches and chargers.

The Control Panel (CP) has an integrated power supply intended to provide charging to EFB tablet devices. The integrated power

supply provides conditioned power to both an attached Tablet device as well as to the Pilots Portable Devices (PED) such as Cell-Phones. Power can easily be disabled by a rotary switch. Tablet power or tablet- and PED power can be disabled separately to avoid hot-plugging. The function is required by certification rules and is in regulatory text denoted as a "Kill Switch".

The CP also provides USB to Ethernet conversion to enable the tablet to communicate over the Ethernet (1000BaseT) with other networked devices or the opposite CP for crosslink functionality.

Support for position configuration is provided through discretes to enable automatic EFB shell configuration and adapt software settings for operation for Captains and First Officers position. Up to four positions can be configured. A dedicated API can be used to read the position from the tablet device.



SPECIFICATIONS P/N 70-12005-00012

Functional Interface

- ETHERNET 1000Base-T
- USB 2.0
- Position Discrete (4 positions)
- Radio Indicator
- USB Charger
(Supports 2A CHG for i-Devices)

Physical Interface

- Weight: 0.4kg
- Size (WxHxD)
146x48x10.7mm
[5.75x1.89x4.21]
(acc. MS-25212)
- Mounting
Locking DZUS
(acc. MIL-F-25173)

Electrical Interface

- DC input: 20-32VDC
(28V nom.)
- Max Current: 3.3A at 28V nom.
- Tablet DC Output
5-21VDC (adjustable)
- USB Charging DC Output
5VDC
- Maximum Load Power Tablet Output
60W
- Maximum Load Power USB Output
10W



WIFI TABLET CONTROL PANEL

Rapid evolution from component based, purposely built EFB equipment, to emerging tablet based solutions, require new versatile and generic components. New technologies must be supported by installed infrastructure now as in the future situation of required upgrades. To be in pace with the technology evolution, The SA Group has developed tailored and versatile functions to support new tablet based Electronic Flight Bag systems.

The Tablet Control Panel provides an avionics style implementation with the same look and feel as onboard OEM equipment and it supports Commercial Off The Shelf Tablets of any kind. Easy mounting and maintenance through standard DZUS size form factors enables effortless maintenance and a single box installation that eliminates additional cost driving provisions such as DC-converters, Kill switches and chargers.

The Control Panel (CP) has an integrated power supply, intended to provide charging to EFB tablet devices and provides commu-

nication interface, both wired and wireless. The integrated power supply provides conditioned power to both attached Tablet devices as well as to the Pilots Portable Devices (PED), such as Cell-Phones. Power can easily be disabled by a rotary switch. Tablet power or WIFI can be disabled separately. The function is required by certification rules and is in regulatory text denoted as a "Kill Switch".

The CP provides network access via Ethernet or WIFI to enable the tablet to communicate with other networked devices. WIFI access is protected by industry standard protocols for encryption such as AES/CCMP and TKIP up to 2048-bit RSA keys.

Support for position configuration is provided through discretes to enable automatic EFB shell configuration and adapt software settings for operation for Captains and First Officers position. Up to four positions can be configured. A dedicated API can be used to read the position from the tablet device.



The avionics competence and extensive knowledge The SA Group has in the area of EFB has been proven in preceding Boeing 737 projects. We feel very comfortable in the way we will utilize the tablet based Class II EFB. The utilization of new technology is crucial in optimizing our daily processes, both today and in the future as we continue to expand.

Marcin Kubrak, Flight Operations Director, Enter Air

SPECIFICATIONS P/N 70-12005-00013

Functional Interface

- ETHERNET 1000Base-T, WIFI 802.11b.g.n
- USB-C
- Position Discrete (4 positions)
- Radio Indicator
- USB-C Charger Power profile 2

Physical Interface

- Weight: 0.4kg
- Size (WxHxD) 146x48x10.7mm [5.75x1.89x4.21] (acc. MS-25212)
- Mounting Locking DZUS (acc. MIL-F-25173)

Electrical Interface

- DC input: 20-32VDC (28V nom.)
- Max Current: 3.3A at 28V nom.
- Tablet DC Output 5.2-21VDC (adjustable)
- USB-C Charging DC Output 5.2VDC (2A) 12VDC (1.2A)
- Maximum Load Power all outputs 80W
 - USB-C Output, Power Profile 2, 18W
 - Tablet Output, 58W

COCKPIT DOOR SURVEILLANCE SYSTEM – CDSS

To provide complete EFB architectures which can fully support all operational requirement from paperless operation to mandates specified in EUOPS, The SA Group has developed an additional EFB module – Surveillance Camera System for Cockpit Door (CDSS), Cabin and Cargo hold.

The network based Surveillance Camera System comprising of cameras utilizing a Central Switch Unit (CSU). The CSU provides ethernet switching capability and power for the camera system and can host up to four camera heads.

The system can be connected to commercial tablets using standard Ethernet or wireless WIFI connection. The Surveillance Camera System provides full frame rate HDTV in H.264 and motion JPEG and are working in light conditions spanning 0.5 – 10000 lux. As an option thermal cameras are available that allows for monitoring under all conditions even complete darkness, suitable to monitor cargo hold for stowaways, thermal activity from baggage or fraud attempts.

The small sensors can be conveniently located behind panels. Multiple streams in H.264 (25/30 fps) and moving JPEG camera heads can host different lenses with 57-145° horizontal field of view. Availability is dependent on certification activity.



INSTALLATION AND INTEGRATION

The cameras and viewing software are easily integrated into any aircraft EFB system, wired or wireless. Viewing and control are performed from the EFB device. The camera viewer function has been successfully integrated into different EFB software suites and can also be operated through a stand-alone software module.

The small sized cameras and scalability from 1 to 4 camera heads for each CSU makes it an excellent platform for customized installation. Currently the system is certified for ATR-42/72 and B737 MAX. Other STCs are pending such as B767 and A320.



ERC-400

– CERTIFIED EFB COMMUNICATION TECHNOLOGY

To support ground based low cost communication, hardware utilizing the latest commercially available communication technology is a key requirement. COTS computers have, and will have, problems to substantiate radio on/off control required by authorities. The key to success is to have dynamic support for evolving communication technology without the burden of high costs for device, network and airworthiness certification.

ADVANTAGES

- Create your Fleet cloud and manage it online with the latest available technology, 4G, LTE, WIMAX, WiFi, without the need to limit your operation to dedicated or certified operators.
- We provide the communication channels required for efficient EFB management, and support the integration of software solutions required for efficient operation, turn-key.

CLOUD SERVICES

- Built in hardware capabilities the device can host Cloud services such as Component Health Monitoring (CHM), which monitor the software status and health of each component in the EFB network.
- To ensure proper configuration control, the Cloud tool ACM (Aircraft Configuration Monitoring) can be utilized by the EFB administrator to monitor on-board equipment, serial numbers, scheduled maintenance in real-time.
- Avoid the pitfalls and let us provide added value by our experienced and recognized team, who have been involved in the majority of the EFB programs deployed worldwide.
- EASA Certification packages available for: A320, B737-3/4/5/6/7/8/900, BAE-146, Q400, E-170, E-190. FAA packages upon request.



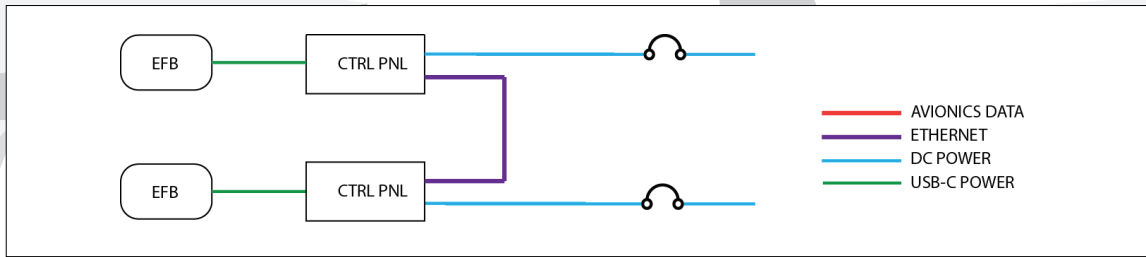
ERC-400™

- Allows for usage of any commercially available USB communication device for Airline and BizJet EFB platforms.
- Leverage on a certified design applicable for any Ethernet based tablet or EFB system and mitigates all concerns of safe radio control.

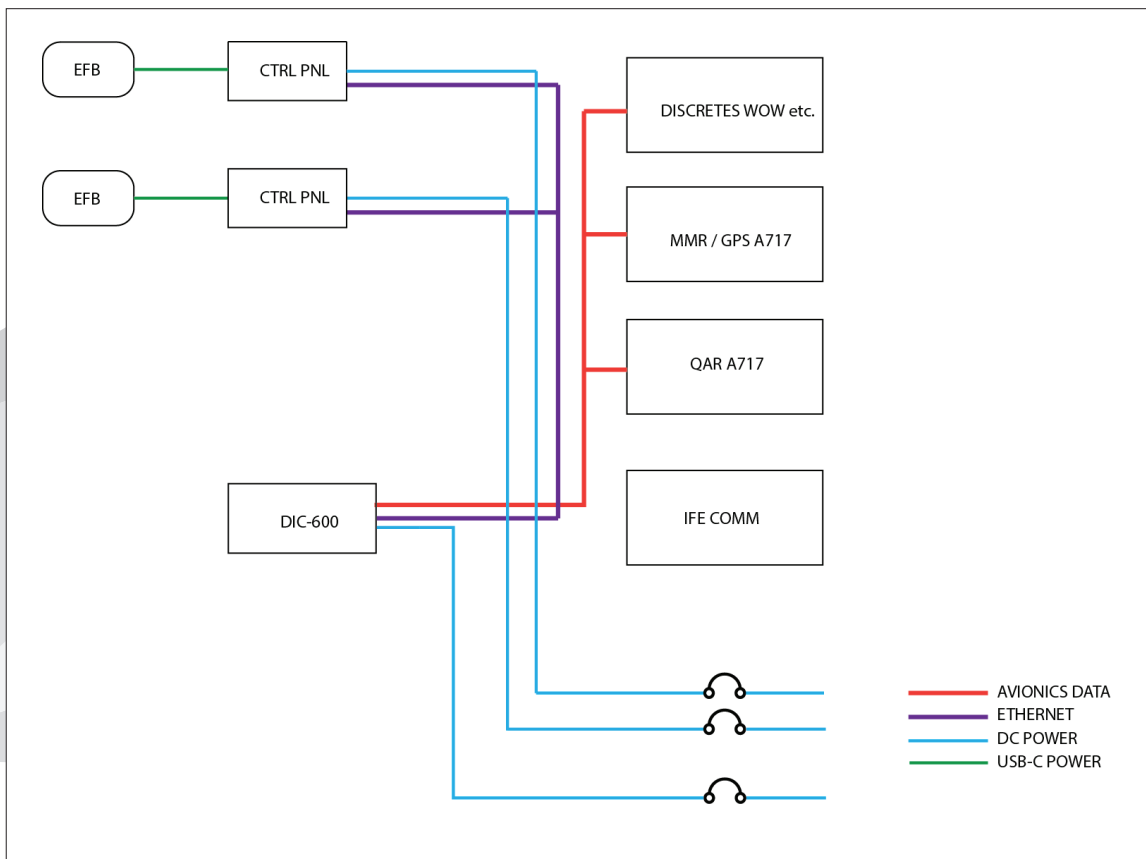
INTERFACES

➤ 1x A664-2/ 100BaseT	100 BASE-T
➤ 4x USB 2.0 downstream ports	USB 2.0 Compatible
➤ 3x Discrete In	
➤ 1x Discrete Out	Radio Enabled
➤ Radio Controller Software API	Integration into custom software
➤ Radio Controller Software	Stand-alone software

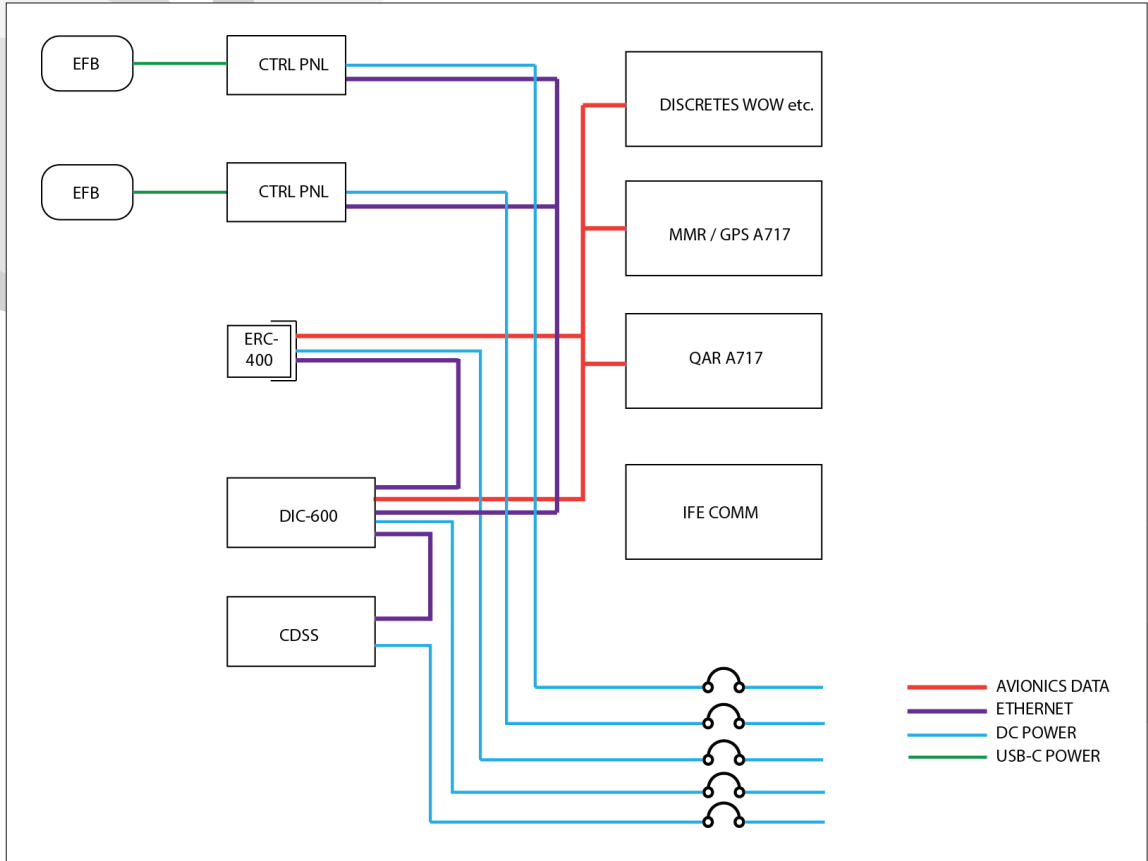
ARCHITECTURE SAMPLE 1



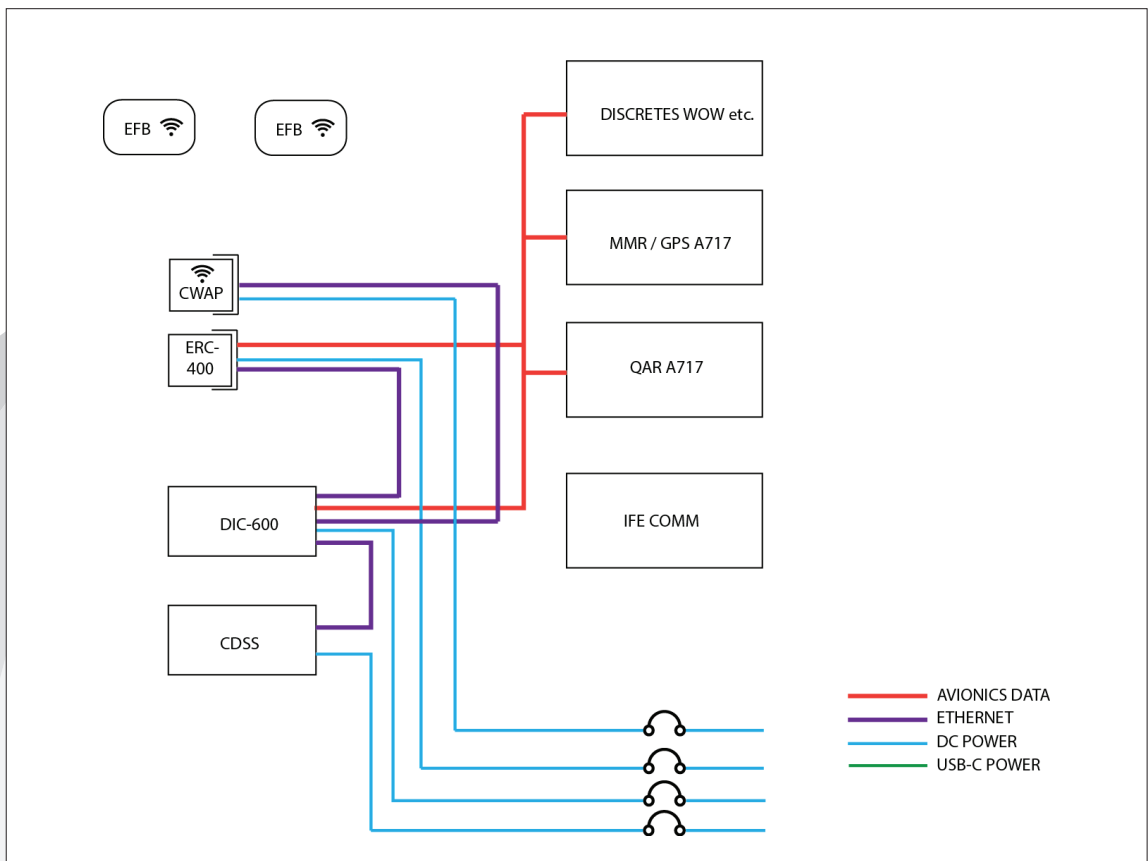
ARCHITECTURE SAMPLE 2



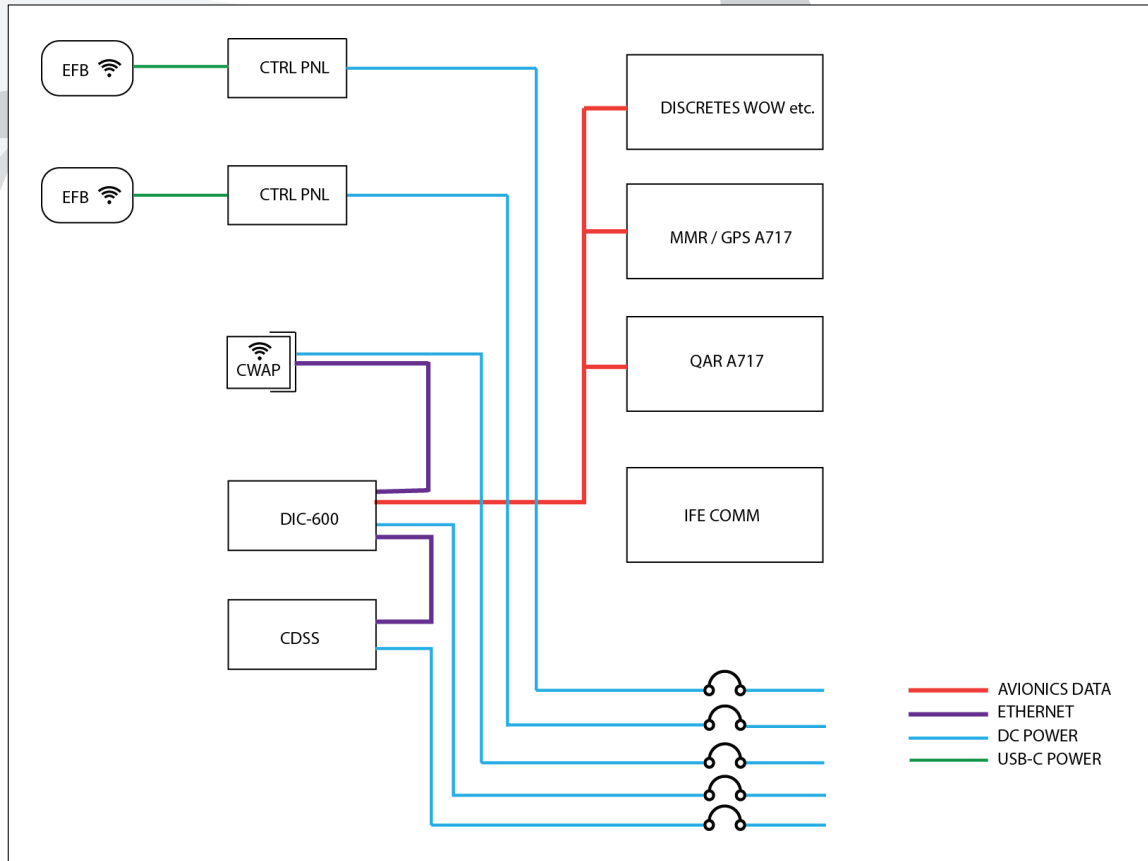
ARCHITECTURE SAMPLE 3



ARCHITECTURE SAMPLE 4

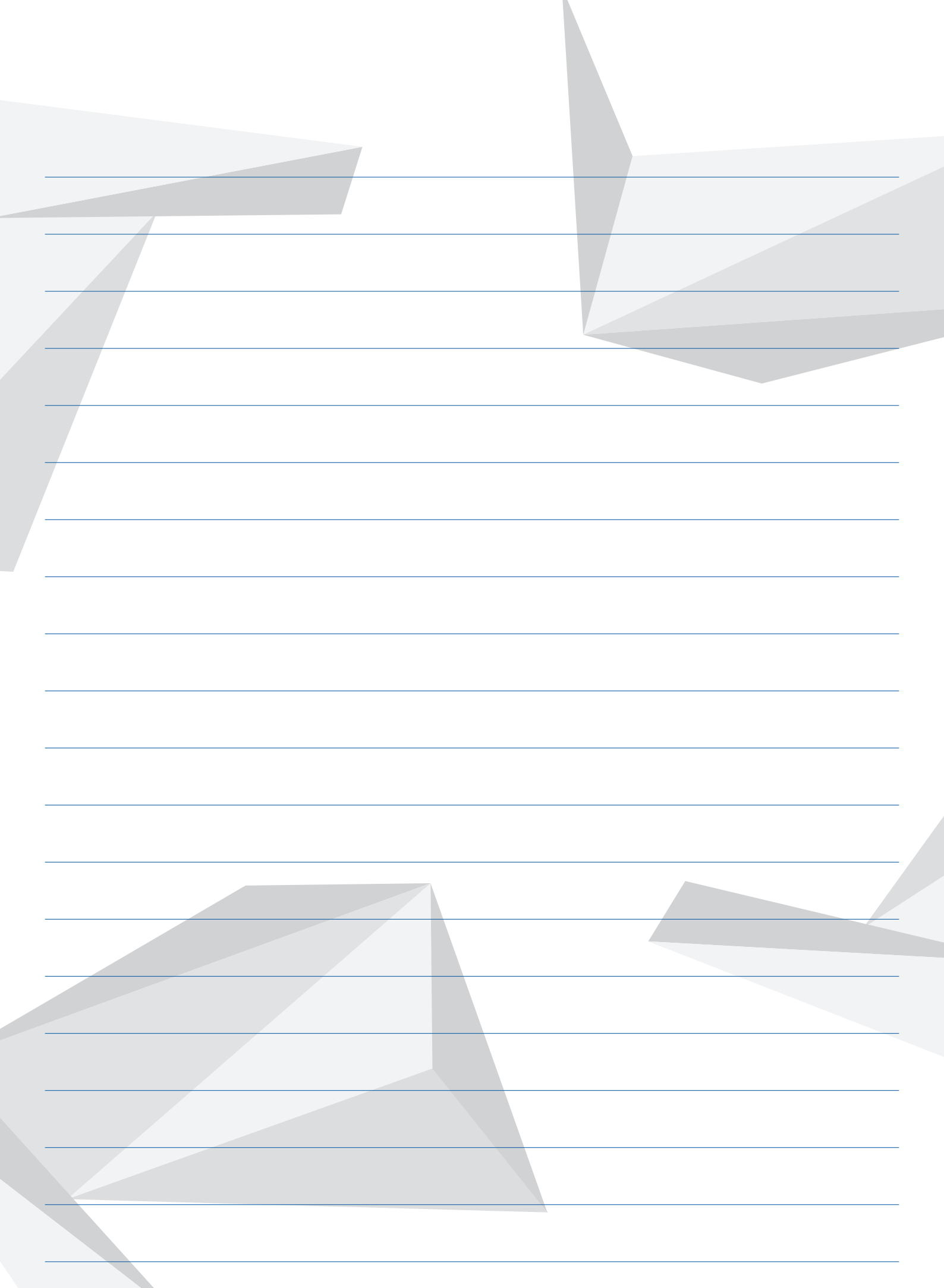


ARCHITECTURE SAMPLE 5



NOTES





A COMPLETE TURN-KEY EFB SOLUTION

ELECTRONIC FLIGHT BAG - EFB

The EFB solution serves as a good example of the product development capabilities offered by The SA Group. The SA Group offers a complete turn-key EFB solution including all equipment, certification, installation, training and other support. At the moment the solution is certified for A320, B737MAX, B737NG, B757, B767, ATP, ATR Q200 and Q400 aircraft and more aircraft types will follow.

The Scandinavian Avionics modular EFB solution consists of:

- Tablet device independent - MS Windows / iOS
- Data Integration Center (DIC-600) for aircraft communication and networking
- Cockpit Wireless Accesspoint - CWAP
- Control panels providing power and network capability as well as auxiliary power for pilot personal devices. Optional wireless network access
- State of the art Cockpit Door- & Cargo Compartment Surveillance system
- Communication module (ERC-400). Ground network with support for worldwide used 3G/4G/LTE/CDMA/WiMAX

The modular tablet based EFB solution from Scandinavian Avionics is a state-of-the-art future proof EFB solution which provides the functionality to meet today's operational requirements of airlines and aircraft operators and at the same time is simple to upgrade in the future to meet new requirements and needs.

The core competence and extensive knowledge Scandinavian Avionics has in the area of EFB has been very important part in our decision making. We feel very comfortable in the way we jointly shaped the implementation path to maximize our re-utilization of installed systems, in combination with the new EFB function. The utilization of new technology is crucial in optimizing our daily processes, both today and in the future as we continue to expand.

Hilmar B. Baldursson, VP Flight Operation, Icelandair

THE SA GROUP

Scandinavian Avionics (SA) provides complete turn-key avionics solutions for civil and military aircraft, helicopters and UAS. Including sales, avionics maintenance (MRO), certification (STC), design & engineering, installation, product development, production, training and consultancy services.

The SA Group consists of 11 divisions located in Europe, the Middle East, South- and Southeast Asia. The headquarters Scandinavian Avionics A/S, which was established in 1978, is located in Billund, Denmark.

APPROVALS

EASA Part-145 | EASA Part-21J | EASA Part-21G | EASA Part-147
FAA Part-145 | TCCA Part-145 | BCAA Part-145 | GAR Part-145 | DOT RIN N083



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