



MISSION CRITICAL SYSTEMS DESIGNER, INTEGRATOR AND OPERATOR

SAF 3000 RADIO SWITCH



PRESENTATION

Any Aircraft in controlled airspace is handled by an Air Traffic Control centre. The controllers perform their mission using radar, radio and telephone services.

The controller communicates with the pilot using radio and with the other controllers using telephone and intercom.

The controller necessary equipments are all grouped on a control desk called Operator Position (OP). These equipments allow to :

- Set the communications with the other air controllers of local centre or adjacent centres,
- Select the necessary transceivers to communicate with the aircrafts according to the controlled airspace zones.

The new generation of "SAF 3000" equipments developed by CS (Communication and Systems) company is mainly composed of a digital radio switch aimed to set voice link between controllers and aircrafts or with other parties through local or remote transceivers.

This Radio Switch has been designed to be fully modular. Each Radio Switch chassis can contain up to 16 MCR ("Micro Commutateur Radio" : micro radio switch) boards allowing to manage 64 Radio Channels and 32 Operator Positions or 32 Radio Channels.

The maximum radio switch configuration is built of 8 chassis, allowing to manage up to 480 Radio Channels and 240 Operator Positions.

The Communications are controlled from Operator Positions (OP) on Controller desks. They are managed by the Radio Switch (RS) with the following functionalities:

- Management of Radio Channels and Operator Positions,
- Configuration and supervision of the Radio Channels (transceivers) and Operator Positions, using the configuration and supervision terminal called PGS (Poste de Gestion et de Supervision).



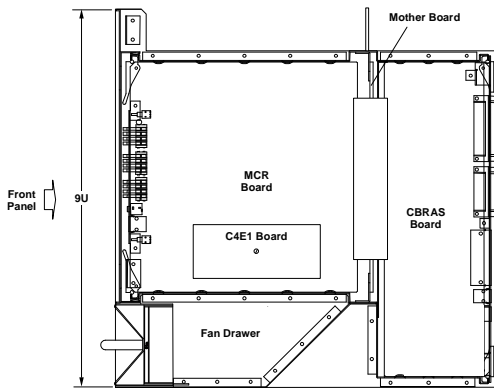
SAF 3000 RADIO SWITCH

COMPONENTS

The Radio Switch "SAF 3000" is built of 1 to 8 chassis. Each chassis can include 1 to 16 MCR boards. Each MCR is connected to a CBRAS board in charge of the external connectors.

Radio Chassis

- It is composed of a 9U 19" rack, equipped with a mother board and 2 power plugs on rear panel.
- The rack provides 16 slots for MCR boards.
- The rear panel and the metal parts of the connectors are shielded to ground.
- The different chassis are interconnected through E1 links for audio and signalling audio and data exchange. For redundant configuration, these links are duplicated.
- The MCR and CBRAS boards are hot-swappable.



FUNCTIONALITY

Radio Switch

- Control and management of voice, PTT command and Squelch signalling between Operator Positions and radio transceivers.
- Audio processing of radio channels.
- Management of radio channels and transceivers.
- Management of Operator Positions.
- Management of data exchange with the configuration and supervision terminal (PGS).

MCR Board

- Management of 1 to 4 Radio Channels / 1 to 2 Operator Positions (possible configuration with 1 to 2 Radio Channels / 1 to 4 Operator Positions).
- Each radio channel includes: 4 wires analogue audio dry loop and serial interfaces
- Redundant Ethernet interface
- Audio processing and test audio interface on board front panel.
- Management of operator commands, Operator Positions configuration data and radio channels information.
- Clock synchronisation between MCR boards and chassis.
- Interconnection using PCM bus between MCR boards in the same chassis.

- Interconnection using E1 interface between several chassis.
- Voice recording output provided by an E1 interface.
- RS232 serial interface dedicated to maintenance, available on board front panel.

CBRAS Board

- Associated with a MCR board, it is in charge to exchange the signals between the MCR board and the external connectors and cables.
- Provide signals protection.

Fan Drawer

- In charge to keep the internal temperature of the chassis under control.
- Equipped with a replaceable dust filter.

CHARACTERISTICS

Dimensions

- 19" chassis : 9U height

Weight

- Equipped chassis : from 18 to 35 kg depending on the number of boards.
- MCR board and CBRAS board : $\approx 0,9$ kg

Power

- 24-48 V DC.
- The input power filter unit is located on the right side of the chassis (front panel) . It is in charge to protect the two power inputs (primary and secondary).
- A bipolar circuit breaker protects each filter and is associated with a power light indicator.

Consumption

- Equipped chassis (16 MCR and CBRAS boards) : 250W max.
- MCR board and CBRAS board: 10W (14W max.)
- Fan drawer : 10W

Environmental constraints

- Comply to ETS 300 019 standard
- Temperatures :
 - Operation : +0°C to +40°C
 - Storage : -25°C to +55°C (class 1.2)
 - Transport : -40°C to +70°C (class 2.3)
- Hygrometry :
 - Humidity rate between 5 and 95% (non-condensate – class 2.3)

EMC and Safety

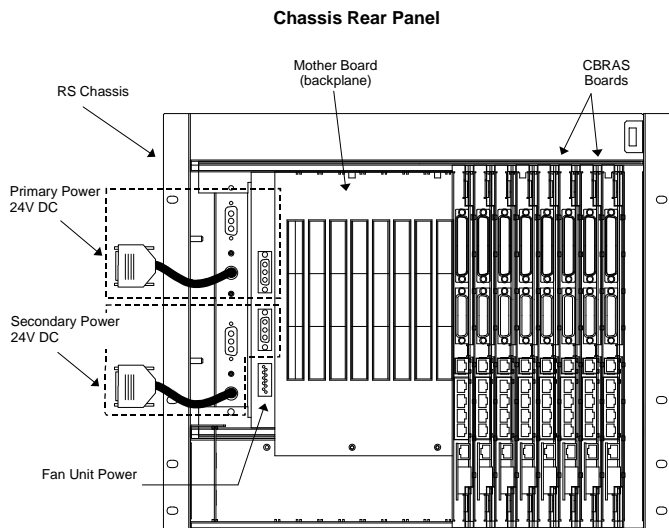
- Complies to EMC constraints (ETS 300 386, EN 55022, EN 61000 standards) :
 - electrostatic discharges (ESD),
 - electrical fast transients,
 - overloads,
 - immunity,
 - transmission.
- Complies to electrical safety constraints for CE marking (EN 60950 standard).
- Complies to the people safety standards and CE marking directives.



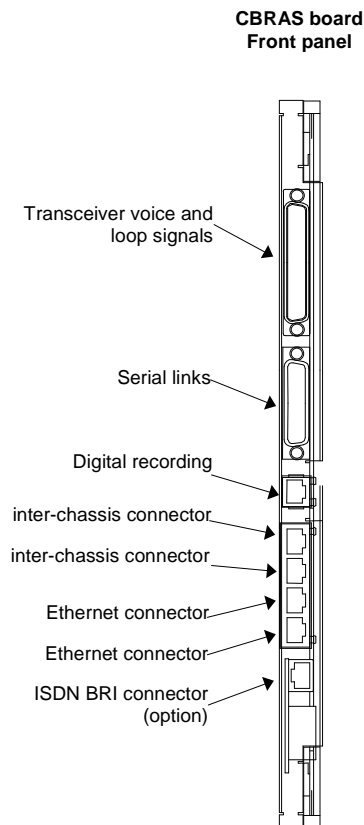
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CONNECTORS

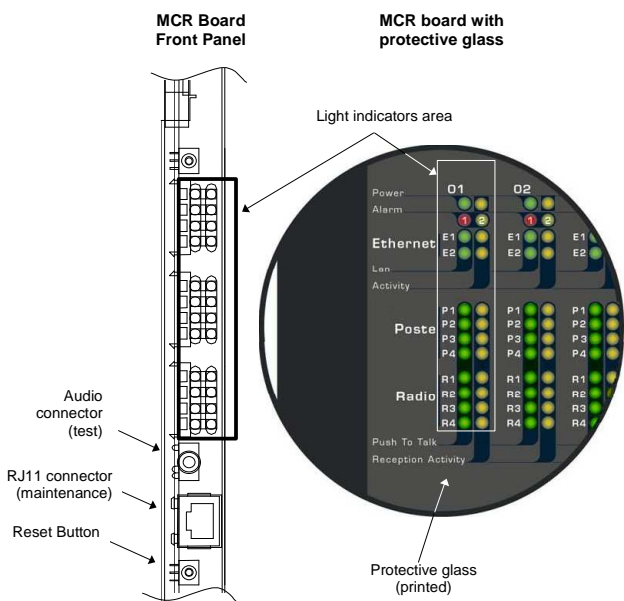
Chassis



CBRAS Board



MCR Board



Status synthetic view on MCR board front panel (printed on protective glass) :

- **Power :**
Operational status of MCR board
- **Alarm :**
status of major and minor alarms
- **Ethernet (Lan) :**
status of Ethernet links
- **Ethernet (Activity) :**
activity on Ethernet links
- **Poste (Push To Talk) :**
Push to talk activation on operator position
- **Poste (Reception Activity) :**
Squelch activity on operator position
- **Radio (Push to talk) :**
Push to talk activation on radio channel
- **Radio (Reception Activity) :**
Squelch activity on radio channel

