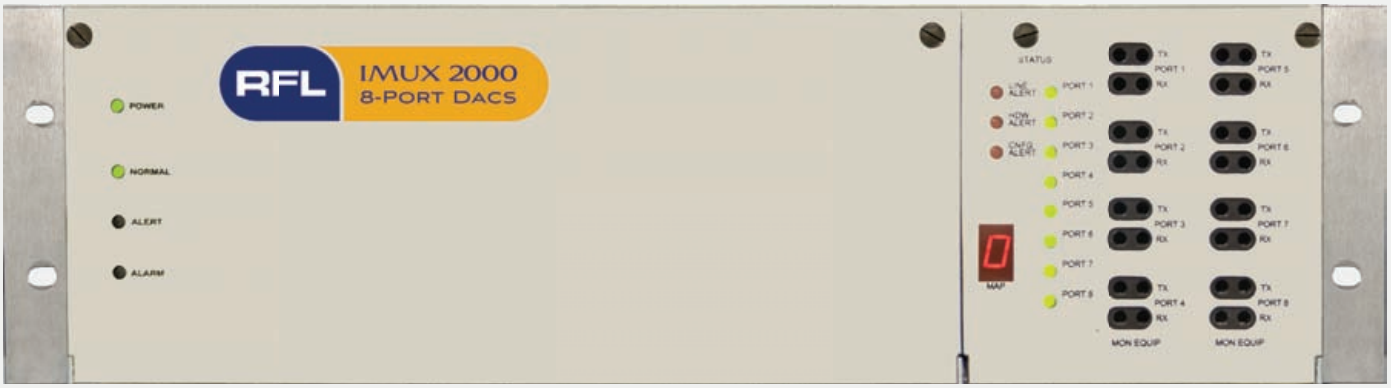
SOLUTIONS FOR AN EVOLVING WORLD

IMUX 2000

8-Port DACS



Your world is changing and so are we.

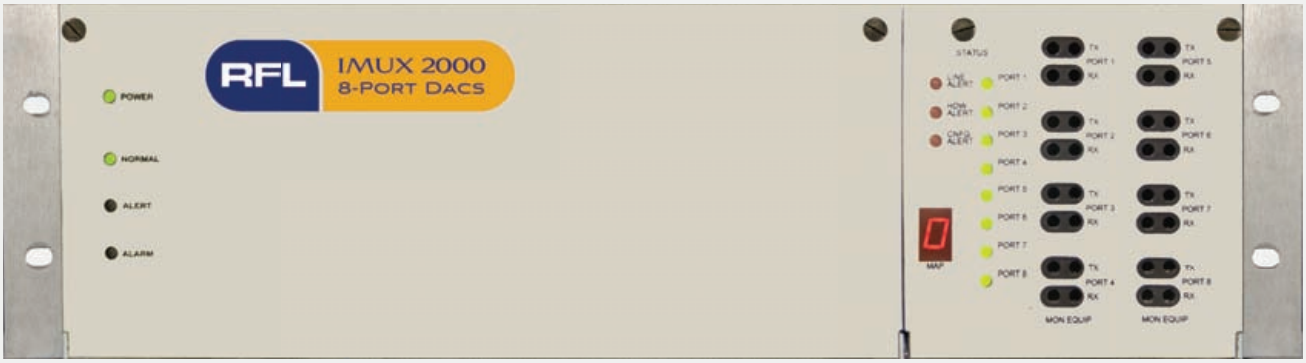
At RFL, we know your needs change much faster than your infrastructure. Our comprehensive line of solutions meets you wherever you are to help you bridge the gap from yesterday to tomorrow.

We aren't just engineering products. We are continuously innovating to give legacy equipment the advantage of today's technologies. Our highly adaptable solutions offer more features for more flexibility and a custom fit for your specific needs.

When we deliver, we also deliver our reputation. So when you open that box, you're opening a custom-engineered solution, factory-tested and ready for deployment.

And as long as you own that equipment, you own the attention of RFL. We see you as our partner and we want to ensure that our solution is working for you – now and over the long haul. RFL – delivering solutions that work. Period.

IMUX 2000 8-Port DACS



Management, protection and routing of critical T1/E1 traffic

The IMUX 2000 8-Port T1/E DACS is designed for stand-alone operation and/or to interface with the IMUX 2000 Multiplexer to support various types of network topologies including “Star”, “Hot-Standby” and “Rings.”

The IMUX 2000 8-Port T1/E1 DACS, provides full cross-connect capability as well as a reliable level of system restoration. The RFL DACS enables the termination of up to eight [8] T1/E1 ports in a common platform while also providing full DS0 Time Slot Interchange capability. Redundant DACS modules are available for critical applications, which cannot tolerate single point of failure network architectures.

Communications interface options for the DACS include built in T1 CSU, or fiber optic interface adapters, using Code Mark Inversion (CMI) encoding technology. In the event the application is time sensitive in nature the RFL DACS can be configured as an Intelligent Line Switch (ILS) in order to provide ultra high speed path switching. System restoration is accomplished through the use of alternate DS0, Time Slot Interchanged maps. The alternate maps are predetermined and pre-programmed through our user friendly Network Management Software. An alternate DS0 map is invoked automatically upon detection of T1/E1 failures (e.g. AIS, Loss of Frame, excessive BER). The time necessary to switch to an alternate map, upon detection of failure, is programmable down to 1 millisecond

Key Features and Benefits

- Optimizes transmission efficiency
- Drastically reduces overall T1/E1 line costs
- Provides T1/E1 connectivity to several sites
- Ideal for edge access and data back haul
- Groom/Concentrate/Hub multiple T1/E1 links
- Consolidation of Enterprise network traffic
- Enables dual T1/E1 Ring interconnection
- Offers automatic re-routing capabilities
- Redundant DACS module and power supply
- Full Time Slot Interchange (TSI) capability
- 1 ms High Speed Intelligent Line Switch
- Rugged design (SWC, EMI, RFI, Temp)
- Intuitive GUI with color coded DACS maps
- Optional SNMP interface compatibility
- Front access T1/E1 maintenance Jack-fields
- Up to 8 T1/E1 ports, fiber optic or electrical
- DACS map and Tri-color port status Displays
- Electrical to fiber optic DS1 migration

Product Applications

Electric Utilities

(Investor Owned, Municipal, Cooperatives, Independent Power Producers)

- Inter-substation communications
- System protection control and monitoring
- Corporate Wide Area Networks
- Substation automation
- Remote station data backhaul
- SONET/ATM backbone access

Transportation

(Traffic, Intelligent Transportation Systems, Airports, Rail/Transit)

- Advanced Transportation Management Systems (ATMS)
- Traffic operation center data concentration
- Wayside communications and signaling for metro/rail
- Airport enterprise solutions

Telco

(RBOC, CLEC, ILEC, ISP)

- Voice, data, video transport
- DSO grooming
- DS1 concentration
- Fractional T1 to subscribers
- Public and private networks

T1 Specifications

DS1 Inputs/Outputs Interface :

DSX-1 interface per ANSI T1.403-1995

T1 CSU line build outs of –7.5dB, -15dB, and –22.5dB

Rate:

Input:
1.544 Mbps ± 30 PPM, using internal timing

Output:
1.544 Mbps ± 30 PPM

Pulse Amplitude:

Per ANSI T1.403-1995

Formats:

Extended Superframe (ESF) per AT&T 62411, D4/ Superframe (SF) per AT&T 43801

Line Codes:

Bipolar with 8 Zero Substitution (B8ZS) & Alternate Mark Inversion (AMI)

Line Impedance:

100 Ohms resistance (nominal)

Avg. Reframe Time:

<25 ms or <1 ms with Fast Reframing channel (FRC)

enabled (FRC reframe for single frame data payload only)

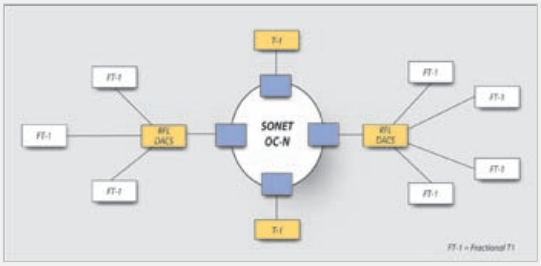


Figure 1 - RFL DACS application DSO grooming of fractional T1.

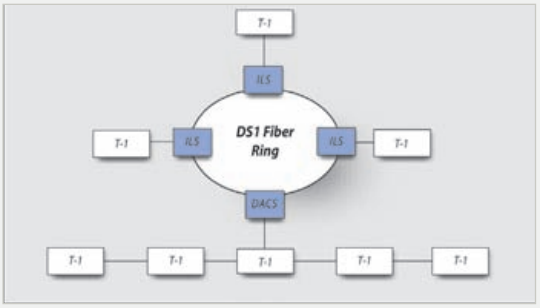


Figure 2 - RFL DACS configured as an Intellgent Line Switch for time sensative high speed switching applications.

E1 Specifications

E1 Inputs/Outputs:

Interface

Conforms to CCITT G.703

Rate:

Input: 2.048 Mbps ± 50 ppm, using internal timing

Output: 2.048 Mbps ± 200 ppm, when not loop or through timed

2.048 Mbps ± 130 ppm, when loop or through timed

Pulse Shape:

Per CCITT G.703

Formats:

Frame Format CCS or CAS as per CCITT G.704 in 30 channel and 31 channel modes

Line Codes:

High Density Bipolar; Order 3 (HDB3) per CCITT G.703 or Alternate Mark Inversion (AMI)

Line Impedance:

Selectable 75 or 120 ohm resistive (nominal)

Average Reframe Time:

<25 ms or <1 ms with Fast Reframing channel (FRC)

enabled (FRC reframe for single frame data payload only)

Because RFL™ and Hubbell® have a policy of continuous product improvement, we reserve the right to change designs and specifications without notice.

Product Specifications

General Specifications

Propagation Delay:

DS1/E1 through Delay DACS:

1 to 3 frames, 2 frames average (250 µsec) for each pass through

DS1/E1 through Delay ILS:

25 µsec for each signal pass through

Switch Time:

DACS DS0, ILS Alternate Maps Switch Time:

Programmable down to 1ms

Environmental:

Operating Temperature:

-20° to +55°C operating

Humidity:

0 - 95% Non-condensing.

SWC & Fast Transient:

ANSI C.37.90-1989 & ANSI C.37-90.1.

EMI: ANSI C.37.90.2.

FCC Compliance:

BCC Part 15 Class A

CE/EMC:

BS EN 5502:1995, BS EN 61000-4-2:1995, BS EN 61000-4-3:1997, BS EN 61000-4-4:1995, BS EN 6100-4-6:1996, BS EN 61000-4-8:1994, DD ENV 50204:1996

PHYSICAL

Dimensions:

Height: 5.25" (134 mm)
Width: 19" (483mm) Wide
Depth: varies depending on I/O in rear of chassis.
Available in 23" width mounting.

Weight:

15 lbs (6.8 kg). for typical fully loaded shelf.

Power Supply:

The RFL DACS has the capability to be equipped with a secondary plug-in power supply for redundancy. The secondary power supply operates on a hot-standby concept versus a load sharing technique:

Input Voltage	Range
24 VDC	19.0 to 29.0 VDC
48/125 VDC	38.0 to 150.0 VDC
220 VAC	180.0 to 265.0 VDC
120 VAC	90.0 to 130.0 VAC
250 VDC	200.0 to 300.0 VDC

Power Supply Capacity: Typically 75 Watts

Optical Interface Adapters:

Wavelength	Emmitter Type	Fiber Type	System Gain
850	LED	Multimode	25 dB
1300	LED	Multimode	25 dB
1300	LED	Singlemode	19 dB
1300	Laser	Singlemode	36 dB
1550	Laser	Singlemode	30 dB

Alarms:

Alarm Types:

Alert: Cautionary conditions that do not prevent multiplexer operation

Alarm: Conditions that directly affect multiplexer operation

Interface:

Front Panel indicators and a RS-232 port for remote access and interrogation.

Shelf, Form C alarm relays rated for 100 mA at 250 Vdc

Test and Diagnostics

Loopbacks:

Remote, Local and Analog DS0 & DS1/E1

Test pattern:

PRBS pattern generation/detection

16-bit loop-up and loop-down code generation and detection.

Specifications Compliance:

ANSI T1.403-1995; ANSI T1.231-1993; ANSI T1.408; AT&T TR54016; AT&T TR62411; ITU G.703;G.704; G.706; G.736; G.775; G.823; G.932; I.431; O.151; O.161; ETSI ETS 300 011; ETS 300 166;ETS 300 233; CTR4; CTR12; IEC 255-5 & IEC 801-4

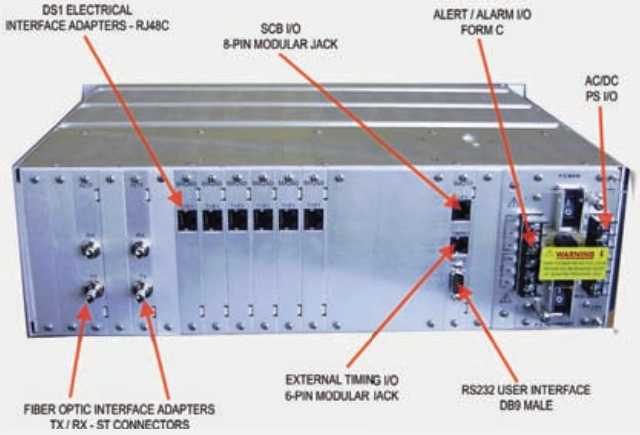


Figure 3 - IMUX DACS back-plane connections (T1 configuration)

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Network Management Software (NMS)

The RFL DACS comes with a user-friendly Windows™ based graphical user interface. This enables the administrator a large amount of flexibility in configuring which DACS map will be utilized and under which pre-determined criteria.

The on board craft interface provides the path to access the NMS either locally or remotely. One will have the ability to provision the system, program the DACS maps, interrogate for alarms, and allow for operation and maintenance.

The NMS offers intuitive color-coded DS0 cross-connect maps to facilitate system programming and to reduce the possibility of human error. Optional SNMP access gateway modules are available to interface the network management system in stand-alone system applications.

Ordering Information

IMUX 2000 8-Port DACS-R T1/E1 Equipment List
Ordering Information

RFL Part Number (fill in blanks): **D**

MODULE ARRANGEMENT		
Single DACS Without Redundancy		A
Single DACS Redundant Ready		B
Dual DACS with Redundancy		C
POWER SUPPLIES		
Single 24 Vdc		A
Redundant 24 Vdc		B
Single 48/125 Vdc		C
Dual 48/125 Vdc		D
Single 115 Vac		E
Dual 115 Vac		F
Single 220 Vac		G
Dual 220 Vac		H
Special		#
JACKFIELD AND DISPLAY		
With Display, no Jackfield		1
With Display and Jackfield		2
SAG MODULE		
No SAG Module or I/O		0
SAG Module and I/O		1
PORT (1-8) INTERFACE		
No Interface		0
T1/E1 RJ48C		1
T1/E1 DB9		2
E1 BNC		3
850 Fiber		4
1300 mm LED Fiber		5
1300 sm LED Fiber		6
1300 sm Laser Fiber		7
1550 sm Laser Fiber		8

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Notes

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