

MULTIMUXA

DAB+ BROADCAST SYSTEM DATA SHEET

Features and Compatibility

System Management

All products operate using a RESTful interface, using HTTPS. Access to the management interface can be via the User Interface or via API (documentation is available upon request).

User Access is based on service provider grouping with multiple access levels. Two Factor Authentication (2FA) can be enabled on a per user basis

Traffic Announcement signalling via API or xNode GPIO
Manual or scheduled Reconfigurations

Multimuxa incorporates full 1+1 redundancy with modes: Main active, Redundant active, Split Operation

System alarming via API GET or via SNMP v1 & 2c trap, including:

- Audio Silence
- PAD Connectivity
- EDI Input/Output Health
- System Time Health

System Logging is available for all aspects of the system health and can be downloaded as CSV.

Standards Compatibility

Factum Radioscape products are fully compatible to the latest version of the DAB ETSI family of standards:

- EN 300 401: DAB system standard
- TS 101 756: Registered Tables
- TS 103 176: Rules of implementation
- TS 102 367: Conditional access
- TS 102 563: DAB+ audio
- TS 103 466: DAB audio
- EN 301 234: MOT
- TS 101 759: TDC
- TS 102 427: MPEG-2 TS
- EN 300 797: STI
- TS 101 860: STI Levels
- ETS 300 799: ETI
- TS 102 693: EDI
- TS 101 499: SlideShow
- TS 102 818: SPI xml
- TS 102 371: SPI binary
- TS 103 177: Filecasting
- TS 102 980: DL Plus
- TS 102 979: Journaline
- TS 102 428: DMB
- TS 103 551: TPEG
- TS 103 689: Filtered Information Service

Outputs

Unlimited number of outputs are supported in the following formats:

- EDI (ETI): via UDP, Multicast or Unicast or TCP
PFT, Transport Headers and Resend capable
- FEP: via UDP, Multicast or Unicast
- ZeroMQ publisher
- Raw ETI over IP

Audio

Please note to ensure proper audio fidelity, all audio should be presented at Broadcast quality, 48Khz and clocked to an appropriate timing source, either input frequency, NTP or PTP. Soundcard driver is reviewed regularly, all details below are correct as of March 2023

Real-time Transport Protocol (RTP) via UDP format:

- MP3
- MP2
- Linear PCM, signed little-endian: 8bit, 16bit, 24bit

Physical Soundcard (AES3) XLR, analogue, or balanced digital AES/EBU

AES67 Audio over IP, including but not limited to:

- Livewire, Dante, Wheatstone, LAWO

Web streaming via IceCast, ShoutCast

- AAC or MP3 formats at all bit-rates

Audio via Transport Stream in MPEG1 Layer 2 format

Audio file playback, .wav and MP3 file types

Audio driver compatibility

- Livewire v2.6.1.18
- WheatNet IP Audio Driver
- Digigram HR Runtime v01.74
- Digigram LXIP Kit v01.02
- Digigram LoLa Kit v01.04
- LAWO R3 v4.2.0.6

Audio Encoding formats - DAB MPEG Layer II v1.1 (Dolby)

Modes:	Mono, Joint Stereo, Stereo
Sample Frequencies:	24, 48Khz
Data Rates:	8kbit/s - 384kbit/s
Protection Rates	UEP1-5

Audio Encoding formats - DAB+ MPEG4-AAC v2 (Dolby)

Modes:	Mono, Mono + SBR, Stereo, Stereo + SIR, Stereo + SBR + PS
Sample Frequencies:	32, 48Khz
Data Rates:	8kbit/s - 384kbit/s
Protection Rates	EEP1A-5B

Data Services

PAD:	DLS, DL+, MOT Slideshow, SPI
NPAD:	MOT, EPG, SPI, TDC, TPEG

Ensemble Management

All ensemble management features are available as standard:

- Frequency (FIG 0/21)
- Other Ensemble Information (FIG 0/24)
- Other Ensemble Announcements
- Extended Country Codes
- Service Linking
- Announcements
- Multiplex Network Signalling Channel (MNSC)
- SCI Data
- TIST Time-stamping

System Requirements

The Factum Radioscape range of software products, like all real-time processing software requires an operating environment suitable for continuous, stable operation along with appropriate processing and storage resources. Please ensure that the host system for Factum Radioscape products meets the minimum hardware specifications listed below. If you are unsure if your hardware is compatible, please contact either your account manager or technical support: support@factumradioscape.com

Operating Environment

Virtualised

Hypervisor

VMware ESXI v6.7 or newer (v7.0 recommended)

Oracle VM VirtualBox

Host

Intel Xeon E5/Silver CPU (10th generation or newer), scaled to number of VM required. Suitable RAM, HDD to accommodate the required number of Virtual Machines:

Guest

Windows Operating System:

Windows 10 Pro (build 20H2 or newer)

Windows 10 Enterprise LTSC (build 21H2 or newer)

Windows Server 2019 (build 20H2 or newer)

Linux Operating System:

Ubuntu v22.0 or newer

Debian v11.6 or newer

8 vCPUs of which (minimum):

1 Sockets

8 Cores per Socket

8GB RAM

38GB Hard Disk Space connected via LSI Logical SAS

Default Video Card enabled

Networking

Either: fixed 100Mbps or 1 Gbps Full Duplex on Network

Separate networks for management traffic (HTTPS, SNMP etc) and data throughput (Audio, EDI etc) is recommended

If NIC Teaming is enabled, ensure 'Explicit Fail over Mode' is selected

Virtual Machine Setup

The following is required to ensure stable operation of virtual machines:

Full Administrator access is available

No contending timing sources (e.g. "Windows Time") are enabled

Defragmentation services are turned off

Resource allocation between Virtual Machines is set appropriately to avoid contention

System Timing

A proper clock source must be provided that conforms with RFC 5905v4 and is disciplined by a recognised time reference source (i.e. GPS/GAL etc.). Performance profile must not exceed:

- 40ms Latency

- Less than 10ms Jitter

Containers

Multimuxa supports deployment in a containerised environment, via either Linux/Windows hosts and containers. Compatible systems include:

Docker v22 and newer

Please contact Factum Radioscape support if you are interested in deploying digital radio in a containerised environment

Industrial PC (IPC)

Intel i5/i7 CPU (10th generation or newer)

AMD Ryzen 5/7 CPU (3000 series or newer)

Windows Operating System:

Windows 10 Pro (build 20H2 or newer)

Windows 10 Enterprise LTSC (build 21H2 or newer)

Windows Server 2019 (build 20H2 or newer)

Linux Operating System:

Ubuntu v22.0 or newer

Debian v11.6 or newer

8GB RAM

At least 2GB Hard Disk Space after OS installation

Redundant Power Supply Units recommended

Networking

Either: fixed 100Mbps or 1 Gbps Full Duplex on Network

Separate networks for management traffic (HTTPS, SNMP etc.) and data throughput (Audio, EDI etc.) is recommended

If NIC Teaming is enabled, ensure 'Explicit Fail-over Mode' is selected

3rd Party Requirements

Factum Radioscape products require the following third-party applications, installation of such products is completed at deployment by a Factum Radioscape engineer

MySQL v10.5

Microsoft .NET6 Runtime libraries

Greyware NTP client v5.2

The following third party software is recommended for installation on all host environments:

Wireshark v4

HTML5 compatible browser such as Firefox (v100 or newer) or

Chrome (v100 or newer)

Support Access

All remote customer deployment are requested to provide VPN access for remote support using a recognised VPN system (i.e. OpenVPN).

Anydesk or Teamviewer remote desktop software may be used, but response times may be impacted should improper setup of these software occurs and remote access is impeded as a result.

Please talk to your account manager or technical support should you require further information



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