

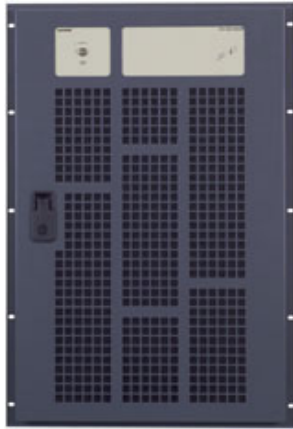
# DMB 670

Transmitter for DAB Digital Radio and DMB Mobile TV

RADIO TRANSMISSION

The DMB 670 VHF solid-state transmitter is designed to provide today's multimedia broadcaster with a transmitter platform capable of multiple modulation schemes. Incorporating the field-proven DAB 665 multi-standard exciter, the DMB 670 provides world-class performance, reliability and quality.

The DAB 665 low-power unit contains complete DAB/DMB signal processing according to the EUREKA Project 147 specifications from the ETI input to the RF output. The low-power unit contains the integrated transmitter control and monitoring system and communicates to the power amplifier (PA) bays in the system via RS-485. The amplifier bays hold a range of RF modules for pre-filter powers from 40 W to 10 kW using straightforward, reliable construction for simple operation and maintenance.



## FEATURES

- Extremely high power density for a compact and lightweight space-saving design
- Reliable COFDM encoder generation with 12-bit resolution and:
  - Uninterruptable input signal switchover
  - Automatic NI/NA input signal detection
- All-digital linear and non-linear pre-correction
- Direct modulation with tunable synthesizer
- GPS-receiver with extremely stable OCXO
- Powerful monitoring system:
  - User-friendly interface PC and Web interface
  - Straightforward control, monitoring and in-depth diagnostics using an easy to use front panel control
  - Optional TCP/IP or SNMP remote monitoring interfaces
- Cost effective — reliable construction
- Digital power levels up to 10 kW pre filter from two 19 inch rack cabinets
- Fully broadband modules 168 to 242 MHz
- 1:1 PA Module to power supply redundancy
- Hot-pluggable, linear RF amplifier modules and auto-ranging power supplies

## PRODUCT DETAILS

Each DMB 670 transmitter combines a low-power unit and one or more amplifier bays, each with various configurations of PA modules to achieve the rated power. The amplifier bays contain several major systems:

### Power Amplifier (PA)

The hot-pluggable module features a pair of broadband (168 to 242 MHz) RF power amplifiers that require no user adjustments. Each amplifier can be easily replaced with a pre-tuned pallet, eliminating the need for optimization in the field. The PA modules are identical and fully interchangeable among all power classes in the DMB 670 transmitter family, regardless of configuration.

### Power Supply (PS)

The hot-pluggable module is a 1200 W, 48 V PS with a .98 power factor and mains input range of 90 to 264 V. The PS interface provides on/off functionality to the power supplies, a fan tachometer alarm and redundant feed to the cooling system. Each module also has 5 V output to redundantly drive the low-voltage control circuits.

### Cooling System

The air-cooling system includes internal redundant blowers that pull cool air from the front through a removable filter, as well as exhausts in the rear. Systems integrated in Harris cabinets feature top exhaust to support ducting and can optionally have ducted air input plenum to permit top, bottom or rear air input.

### Control System

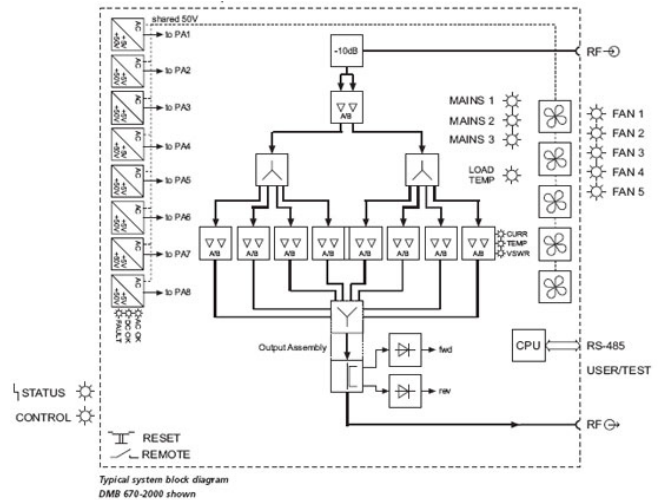
The main system control is located in the low-power unit and communicates with each amplifier bay, each of which has independent protection and control capabilities. Each PA module has dedicated control and monitoring to support on/off functionality and alarms for reflected power, temperature and current overloads.

### Output Filter

Optionally used to ensure mask compliance. These filters are compact, temperature-stable and provide low insertion loss. The non-critical spectrum mask filter has a six-circuit bandpass, while the critical mask filter requires the addition of two traps.

## IMAGES/DIAGRAMS

V 670 - 2000/D Amplifier Diagram



# DMB 670

## Transmitter for DAB Digital Radio and DMB Mobile TV

### SPECIFICATIONS

Specifications and designs are subject to change without notice.

#### General

Modulation Type	DAB mode I
DAB Power Output Range (rms) <sup>1</sup>	DMB670-125: 35 to 160 W DMB670-250: 125 to 315 W DMB670-500: 250 to 630 W DMB670-1000: 500 to 1250 W DMB670-2000: 1000 to 2500 W DMB670-4000: 2000 to 5000 W DMB670-6000: 3000 to 7500 W DMB670-8000: 4000 to 10000 W
Excitation	DDS synthesis, no-IF, direct IQ modulation on channel SFN-capable with external reference or internal GPS option DMB670-125/250: DAB-665/0.2T-E06 DMB670-250/.../8000: DAB-665/40T-E06
RF Amplifiers	MOSFET, broadband (no-tune), hot plug modular, universal (same type, all tx models), 9.9 lbs (4.5 kg)
Power Supplies	Switchmode, auto-ranging, hot plug modular, universal, 5.5 lbs (2.5 kg)
Frequency Range	174 to 240 MHz, in 8 kHz increments
Frequency Stability	<5 x 10 <sup>-10</sup> per day (OXCO aging) (without ext. reference)
Power Stability	±0.25 dB
VSWR	Protected against open or short circuit, all phase angles Capable of operation into infinite VSWR with user-adjustable foldback threshold Factory pre-set to 4% of nominal nameplate power (VSWR = 1.5:1)
Harmonic/Spurious Output	Complies with EN 302077-2 when used in conjunction with filter having following attenuation specifications:
Critical Mask	Integrated in-band loss <1 dB fc +/- 970 kHz: >15 dB fc +/- 1.75 MHz: >45 dB fc +/- 3 to 10 MHz: >45 dB 2 fc: >50 dB 3 fc: >10 dB 4 fc: >0 dB
Non-Critical Mask	Integrated in-band loss <1 dB fc +/- 970 kHz: >0 dB fc +/- 1.75 MHz: >15 dB fc +/- 3 to 10 MHz: >45 dB 2 fc: >50 dB 3 fc: >10 dB 4 fc: >0 dB
Shoulder Pre-Filter	<-35 dB, minimum <-40 dB, typical (compensated)
Shoulder Post-Filter	<-45 dB, minimum (compensated) <sup>2</sup>
Nonlinear Precorrection	All-digital, user-adjustable Storage of 7 presets DAB critical mask compliant over entire power range without need for re-adjustment (when used with specified filter)
Linear Precorrection	All-digital linear compensation of mask filter frequency response
In-Band Frequency Response	<1 dB <sup>3</sup>
Phase Noise	TR 101 496-3 compliant

Minimal Performance Levels	10 Hz to 75 Hz	-50 dBc
	250 Hz	-60 dBc
	1 kHz	-72 dBc
	2 kHz	-78 dBc
	10 kHz	-92 dBc
	100 kHz	-112 dBc

Inherent Processing Delay	183 ms 83 ms seamless input switcher 100 ms COFDM encoder
Delay Compensation	Dynamic (network padding) delay: 0 to 1 sec in 61 ns steps Static (transmitter trimming) delay: 0 to 1 sec in 61 ns steps

#### AC Mains

AC Mains Requirement	195 to 264 V 47 to 63 Hz, IEC C14 inlet for exciter and following connections to power amplifiers: DMB670-125/.../500: 90 to 264 V, 47 to 63 Hz, dual IEC C20 inlets <sup>4</sup> DMB670-1000: 190 to 264 V, 47 to 63 Hz, triple IEC C20 inlets <sup>5</sup> Configurable on-site for single or three-phase connection: 190 to 264 V single phase, 190 to 264 V delta, 190 to 264 V wye, or 330 to 450 V wye DMB670-2000/.../8000: Same as 1000 W model except triple PowerCon NAC3MPA inlets for each 2000 W chassis Optional in-rack AC distribution chassis provides individual circuit breaker protection for each mains input
Power Consumption	DMB670-125: 1000 W maximum, 800 W typical (including exciter, at maximum before-filter power level) DMB670-250: 1500 W maximum, 1300 W typical 8.5 Power Factor (displacement) 0.98, typical
Phase Rotation/Balance	All AC inputs independent Observation of correct phase rotation and balance not required
Mains Restart	>80% output power in less than 5 sec after AC mains failure

#### Environmental

Altitude	9,842 ft (3000 m) elevation above mean sea level
Ambient Temperature Range	32 to 122° F (0° to 50° C) at sea level Upper limit de-rated 2° C per 984 ft (300 m) elevation AMSL
Humidity	95%, non-condensing

#### Mechanical

Dimensions <sup>6</sup>	Standard EIA rack 48.3 cm (19 in.); 1RU = 4.45 cm DMB670-125: 5RU amp + 6RU exciter, 60 cm depth DMB670-250: 5RU amp + 6RU exciter, 60 cm depth DMB670-500: 5RU amp + 6RU exciter, 60 cm depth DMB670-1000: 16RU amp + 6RU exciter, 62 cm depth DMB670-2000: 16RU amp + 6RU exciter, 62 cm depth DMB670-4000: 44RU rack, 91 cm depth DMB670-6000: 2 x 44RU rack, 91 cm depth DMB670-8000: 2 x 44RU rack, 91 cm depth
Weight, Exciter/Low Power Stage	DAB-665/40T: 30 kg approx.
Weight, Amplifier Chassis (all modules installed)	DMB670-125: 25 kg approx. DMB670-250: 35 kg approx. DMB670-500: 35 kg approx. DMB670-1000: 65 kg approx. DMB670-2000: 95 kg approx.

# DMB 670

## Transmitter for DAB Digital Radio and DMB Mobile TV

Weight, Transmitter . . . . . DMB670-4000: 240 kg approx.  
(all modules installed) DMB670-6000: 330 kg approx.  
DMB670-8000: 480 kg approx.

Air Cooling . . . . . Air input with built-in filter at front  
Air exhaust with built-in DC fans at rear  
Ducted air exhaust and/or input available as option  
DMB670-125: 6 m3/min.  
DMB670-250: 12 m3/min.  
DMB670-500: 12 m3/min.  
DMB670-1000: 34 m3/min.  
DMB670-2000: 34 m3/min.  
DMB670-4000: 68 m3/min.  
DMB670-6000: 102 m3/min.  
DMB670-8000: 136 m3/min.

Ambient Noise . . . . . Worst case, 1 m from front face, 1 m above ground  
Mounted in rack, no ducted air input or exhaust  
Figures in parentheses are for ducted air input and exhaust option  
DMB670-125: <65 dBA  
DMB670-250: <68 dBA  
DMB670-500: <68 dBA  
DMB670-1000: <73 dBA (65 dBA)  
DMB670-2000: <73 dBA (65 dBA)  
DMB670-4000: <76 dBA (67 dBA)  
DMB670-6000: <78 dBA (69 dBA)  
DMB670-8000: <78 dBA (69 dBA)

### Inputs/Outputs

RF Output Connector . . . . . DMB670-125: Type N female, 50 ohms  
DMB670-250: Type N female, 50 ohms  
DMB670-500: Type N female, 50 ohms  
DMB670-1000: DIN 7-16 female, 50 ohms  
DMB670-2000: EIA 1-5/8 flangeless, 50 ohms  
DMB670-4000: EIA 1-5/8 flangeless, 50 ohms  
DMB670-6000: EIA 1-5/8 flangeless, 50 ohms  
DMB670-8000: EIA 1-5/8 flangeless, 50 ohms

ETI Inputs/Outputs . . . . . BNC female, 75 ohms 2 x ETI (NI, G703) or 2 x ETI (NA, G704) with auto-sensing, auto switchover, and optional descrambling  
Manual or automatic switchover based on user-defined thresholds/priorities  
Seamless switching of two coherent ETI signals  
Muting upon absence of valid ETI input  
Optional 2.048 Mbit/s, unbalanced/balanced adapter

QPSK Input . . . . . SMA female, 50 ohms, 950...2150 MHz, -65...-25 dBm typical, 55 MHz BW, 1...45 MSymb/s, DVB-S QPSK per EN 300421

LNB Supply . . . . . +12.5...+4 V (maximum 350 mA) (vertical)  
+17.2...+18.8 V (maximum 350 mA) (horizontal)

GPS Input . . . . . SMA female, 50 ohms, 1.57542 GHz, -130...-100 dBm (+5 VDC @ 100 mA max output for active antenna)

1 pps Input . . . . . BNC female, 75 ohms, TTL level, rising-edge

Reference Frequency Input . . . . . SMA female, 50 ohms, 0.1/0.5/1/2.048/5/10 MHz, -7...+15 dBm

Frequency Control Switching . . . . . Manual or auto selection of internal GPS, external 1 pps, or external reference frequency by user-defined priorities  
Muting upon failure of reference after user-adjustable hold-over (0 to 24 h approximately)  
72-hour hold-over optional with precision oscillator option

Sample Monitoring Ports . . . . . SMA female, 50 ohms  
SAT IF- ETI OUT  
ETI (NI)- ETI frame  
COFDM frame  
LO- RF monitor (low power stage)  
1 Hz (1 pps signal)  
Reference frequency 10 MHz  
Incident and reflected signal Tx output (optional)

### Remote Control

RF Output Alarms . . . . . User-adjustable warning and error thresholds (nominal -0.5 dB and -3.5 dB from factory)

Parallel Remote . . . . . DB37 female. Pin assignment programmable via Web remote

Relay contacts . . . . . 25 mA @ 24 VDC

Digital inputs (TTL level) . . . . . Pulse duration ≥100 ms signal

RS-232 (TCP-IP) . . . . . DB9 female

Bit-Bus In/Out (RS-485) . . . . . DB9 male/female

Ethernet (optional) . . . . . RJ-45, twisted pair  
- SNMP control (v1, v2c, v3)  
- Web control (java applet)  
- E-mail notification

Security Interlocks . . . . . DB9 or DB15 female  
- Safety loop (forced stop)  
- RF blocking (forced RF mute)

MSNC Control . . . . . Via ETI stream  
- DAB mode  
- Muting  
- Dynamic delay  
- Static delay  
- Offset delay  
- TII value

Compliance . . . . . RoHS 2002/95/EC  
R&TTE 1999/5/EC

(1) Power ratings are at amplifier output connector/before DAB mask filter  
(2) When used with minimum specified critical mask filter, above  
(3) At amplifier output, any frequency, any time (N+1 applications). Excludes output filter  
(4) Certified to 100 to 240 V nominal range +/- 10% testing margin  
(5) Certified to 208 to 240 V nominal range +/- 10% testing margin  
(6) All figures for DMB670-125/.../2000 models are for basic exciter and power amp combination without optional rack pre-integration  
All figures for DMB670-4000/.../8000 models include EIA rack. Add 34 cm to rack depth for optional ducted air input option

DMB 670 Model	125	250	500	1000	2000	4000	6000	8000
Power Before Filter-Watts	35 to 160	125 to 315	250 to 630	500 to 1250	1000 to 2500	2000 to 5000	3000 to 7500	4000 to 10000
Output Connector	"N" female	"N" female	"N" female	DIN 7-16	1-5/8 in. EIA	1-5/8 in. EIA	1-5/8 in. EIA	1-5/8 in. EIA
Rack Space	11RU	11RU	11RU	22RU	22RU	1 Cabinet	2 Cabinets	2 Cabinets
PA Modules	1	2	2	4	9	18	27	36
PS Modules	1	2	2	4	8	16	24	32