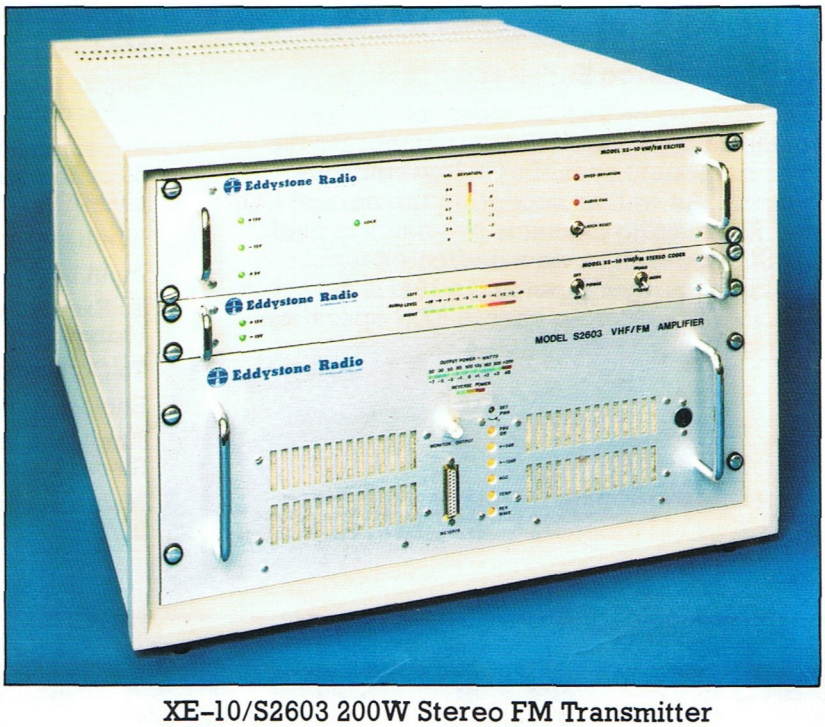
Eddystone Radio

LOW POWER VHF/FM TRANSMITTER MODEL XE-10 SERIES

XE–10 15 Watt Stereo FM Transmitter

Benefits

- Low cost
- Stereo coder available as option
- Optional power amplifiers 15W and 200W
- Synthesised frequency control
- SCA and RDS inputs available
- Performance to CCIR & ITU specifications
- Modular construction
- Full status indication
- Available for 19 ins rack mounting or with optional desk-top cabinet



XE–10/S2603 200W Stereo FM Transmitter

LOW POWER VHF/FM TRANSMITTER MODEL XE-10

General Description

The Model XE-10 is a high quality Transmitter which complies with CCIR and ITU specifications. The XE-10 exciter is capable of driving VHF power amplifiers. Amplifiers currently available are a 15 Watt (adjustable for 5–15W) and the S2603 200 Watt (adjustable 20–200W).
The XE–10 comprises a 2U (90mm) exciter chassis a 3U (133mm) amplifier/power supply with an optional 1U (44.5mm) Stereo Encoder.

Amplifier Options

The amplifier options are the 15W at 3U (133mm) and the S2603 200W at 4U (178mm). All the sub-units are housed in sturdy 19 ins rack cases which offer simple access to internal circuit boards for ease of maintenance.

The XE-10 Exciter

The XE-10 Exciter is a Broad Band synthesised design which operates between 87.5 MHz and 108 MHz. The operating frequency can be chosen in increments of 50 Hz by selection of the appropriate binary code on internal DIL switches. Balanced audio inputs for both stereo and mono operation are provided. The mono input is fitted with pre-emphasis and input attenuators which will accept signal levels of between −10dBm and +10dBm.
The XE-10 power supply and power amplifier uses linear regulators for all power rails. RF power metering and VSWR protection circuitry is included. An internal temperature sensor trip ensures thermal runaway is prevented should the cooling fan fail.

Optional Stereo Encoder

The optional Stereo Encoder incorporates a linear balanced modulator to generate the "S" component resulting in low spurious outputs. As well as accepting the normal Left and Right audio channels provision is made for SCA operation via a dedicated input socket. A further input and a 19kHz output are also provided to enable RDS operation.

Specification

Frequency range: 87.5 to 108MHz.

Output Power: 3 to 15 Watts (adjustable), or 20-200 watts (adjustable) with S2603.

Output Power Monitoring: by meter to within 1dB.

Output fully protected against mismatch.

Output power will shutdown if v.s.w.r. is >2:1.

Power Output Temperature Stability: <10% (0.8dB).

Spurious Emissions: <−70dBc.

Harmonics Emissions: <−65dBc.

Aircraft Band (108MHz – 118MHz).

<−90dBc in a 1KhZ bandwidth.

Frequency Stability: +/− 1kHz.

Carrier Centre Frequency Drift due to modulation: <200Hz.

Deviation (Std): +/− 75kHz (+/− 4%)

Deviation Monitoring: By LED 8.5kHz – (−19dB) to 84kHz (+1dB) with latched "Over deviation" LED.

Distortion (typical): 0.1% .

Distortion (maximum): 0.15% .

Frequency Response: (multiplex) 40Hz to 100kHz (+/− 0.3dB).

(Audio) 40Hz to 15kHz (+/− 0.5dB).

Audio Noise: (measured peak, weighted in accordance with CCIR 468, pre-emphasis "IN").

Monophonic operation: better than −70dB (ref 1kHz level for +/− 54kHz rf carrier frequency deviation).

Stereophonic operation: better than −65dB (ref 1kHz audio level in either stereo channel for +/− 61kHz total rf carrier frequency deviation (including pilot tone).

Stereophonic Left/Right Channel Crosstalk:

Better than 50dB from 40Hz to 15kHz.

Modulation: Wideband Linear FM (F3E).

Stereo Mode: GE Zenith Pilot-tone System as defined in CCIR 450.

Pre-emphasis: Per audio channel defeatable with 50 or 75 usecs time constant (+/− 1usec in each case).

Input: 600 ohms balanced or unbalanced.

Input Levels:

To Exciter: monophonic or multiplex; −10dbm to + 10dbm.

To Coder: 0dbm or +10dbm; (adjustable +/− 2db).

Enclosure Type: Exciter 2U, 19 inch rack mounting.

Amplifier: 3U, 19 inch rack mounting.
Stereo Coder: 1U, 19 inch rack mounting.

Mains Voltage Supply: 220V to 240V (+6/−10%); 50/60Hz.

Eddystone Radio

A MARCONI COMMUNICATION SYSTEMS COMPANY

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Medium/High Power Solid State FM Transmitter

Features

Eddystone B6600 series of Medium/High Power Solid State Stereo FM Transmitters include the following features.

- 3-20kW Output Power
  All solid state using dual sourced FET devices in inter changeable modules
- Patented N way combining and splitting modules using easily replaceable rigid coaxial cable assemblies
- Broadband, 87.5 to 108MHz with no tuning adjustments required
- Unique FET control increases device efficiency to a minmum 60% under worse conditions (typically 70-75%)
- Comprehensive control and monitoring facilities of transmitter and exciter during Local and Remote operation
- Integral Stereo Exciter
- Mains transformer design minimises in-rush currents and transients. All AC switching and fusing is mounted on the transformer module. An extractor is supplied allowing installation or replacement in 20 minutes
- A spare secondary output is provided for increased redundancy
- Complete transmitter system up to 10kW can be contained in a single 19 inch cabinet
- Modular concept ensures fast low-cost installation
- External Air Handling Unit and Low pressure air flow ensures quiet operation

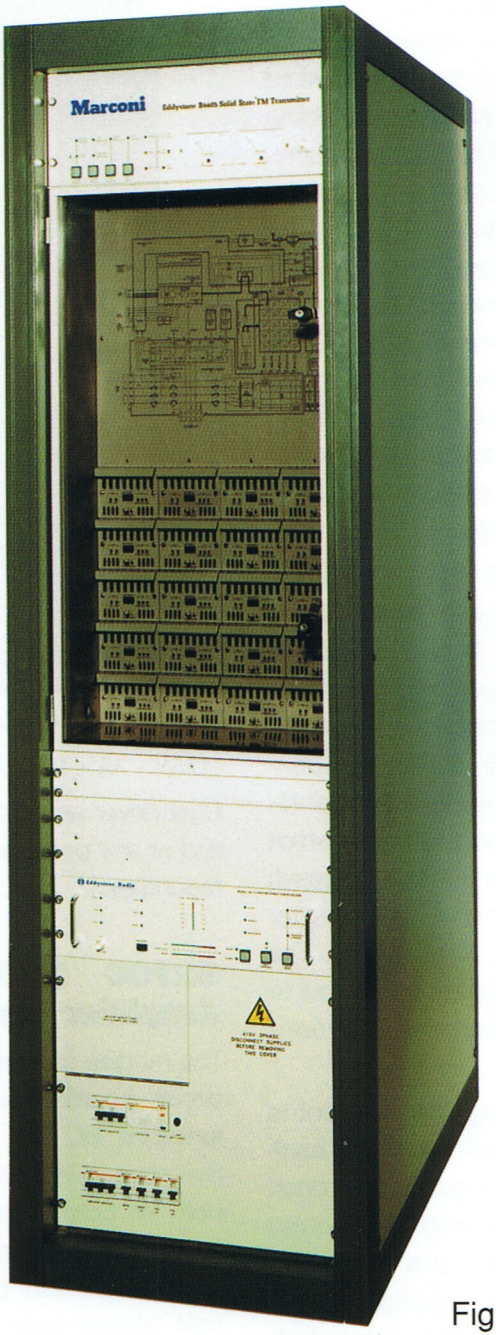

Fig. 1

General Description

The Marconi Eddystone B6600 Series are of the very latest in solid state technology. The concept is based on a highly modular approach. The power bank has the form of an array of lightweight 300W power amplifier modules each with an integrated highly efficient switched mode regulator and control circuit mounted on a common heat sink. Each 300W amplifier module can be considered as a 'mini system' only requiring a raw AC supply from the multi-secondary three phase transformer. A patented N-Way splitter provides each module with RF input sourced from the exciter, whilst the RF output from each module is combined by the same unique method of N-Way combining. The adoption of the 300W power level for the amplifier modules achieves a very gradual failure mode and allows on-air replacement in the very short time of 10 seconds.

Mechanical (Fig 1)

All power combinations can be accommodated in a 19 ins cabinet; the exact layout being dependent on the number of modules required to build-up the required 'power bank'. Main power input to the transmitter can either be from the top or bottom of the cabinet at the rear. If wired from the top incoming mains cabling is fed via conduit to the mains terminal block which forms part of the transformer assembly. The modular transformer assembly comprises a 3 phase transformer with seperate 3 phase secondaries at 80V AC for each of the 300W modules in the 'power bank'. Main circuit breakers are situated on the front of the transformer assembly along with fuses for the 80V AC supplies.

The whole transformer assembly is mounted on wheels which allows easy installation in the transmitter cabinet. The assembly can be removed and replaced in minutes if required. Directly above the tranformer assembly is located the ancillary equipment compartment which has room for two FM exciters (each of 3U high) and an exciter changeover unit of 1U height. The equipment is mounted on runners to allow ease of adjustment and maintenance.

Above the ancillary compartment is located the power amplifier bank behind a toughened glazed door. The 300W power amplifier modules sit in a box matrix. For a 5kW transmitter there are nineteen power amplifier modules plus a twentieth used as a pre-amplifier. In the 10kW transmitter there are 38 power modules and two pre-amplifiers making a matrix of forty over all.

For standard power outputs the module quantities employed are as follows :

3kW - 12 + Driver Amplifier = 13

4kW - 15 + Driver Amplifier = 16

5kW - 19 + Driver Amplifier = 20

7kW - 27 + Driver Amplifier = 28

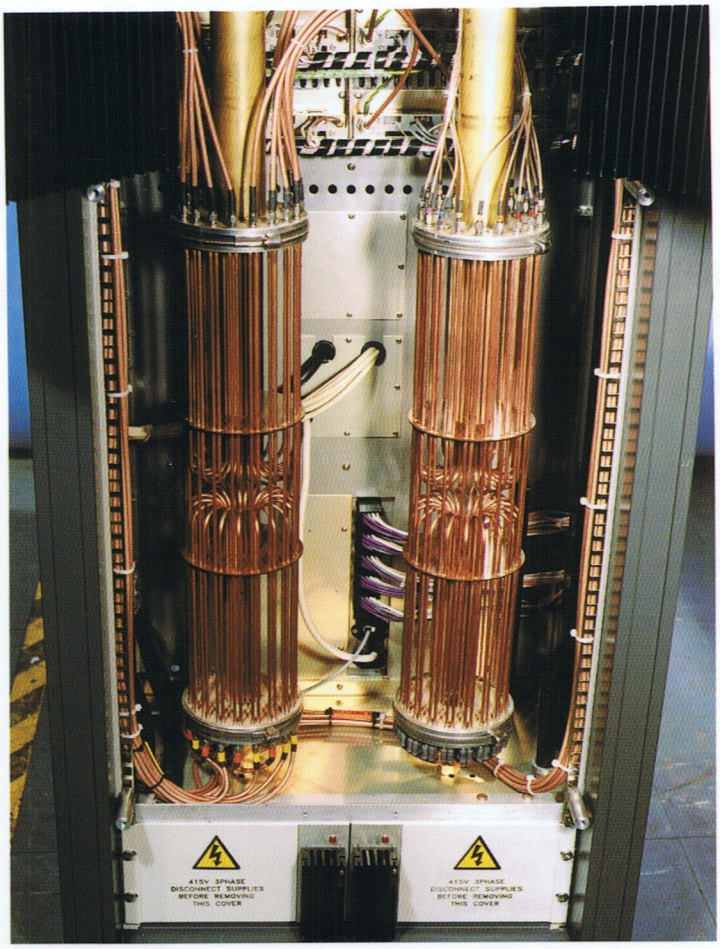

Fig 2

8kW - 31 + Driver Amplifier = 32

10kW - 38 + 2 Driver Amplifier = 40

Dual driver amplifiers can be specified at any power level for additional redundancy.

S2700 300W Power Amplifier Module(Fig 3)

The module comprises three printed circuit boards which perform the functions of, RF Power Amplifier, Switching Regulator and Control Unit. All boards are mounted on a customised heatsink extrusion specially designed for maximum thermal heat transfer from the RF device in the worst ambient temperatures.

The rear mounted regulator board accepts 80V three phase AC which is passed to the switching circuit to provide a normal +50V DC at a current of 12 Amps. The regulator includes a special circuit to improve the efficiency of the RF device to that approaching 75%.

The centrally mounted RF amplifier board utilises a single 300W MOSFET device with a stabilising gate biasing circuit. An input level of 6W is required to give the rated power output which is fed via an output directional coupler to the Control board for monitoring of the forward and reverse power levels. The RF amplifier is broadband matched to give full performance over its 87.5 to 108MHz frequency range without retuning.

The Control Board, mounted at the front of the module, has the principle function of protecting the RF stage MOSFET against damage due to excessive voltage, temperature or reflected power and to protect the Switch Mode Regulator against damage from excessive mains input fluctuations.

The front panel LED displays indicate the immediate operational status of the module and act as the first level of fault diagnosis. A metering socket is also included on the panel which operates with the S2705 hand held test meter to provide digital monitoring of RF amplifier Voltage, Current, Operating Temperature and RF power output.

S2702 Splitter and Combiner (Fig 2)

At the rear of the cabinet behind a removable cover is found the "N" Way rigid coaxial splitter and combiner. In front of the splitter and combining units are the combiner load assemblies and heat sinks mounted on hinged 'doors' so that they may be moved away to allow access to the rear of the amplifier compartment. The Marconi patented combining technique employed is derived from the well known two way hybrid commonly known as the "rat race". The use of this design of "N" Way splitter and combiner enables module failure to occur 'gracefully', that is, any power reduction will occur in small steps and not in a catastrophic manner.

Estimated Air Flow requirements (cubic feet per minute) are as follows:

3kW transmitter : 600c.f.m./1.3" WG

5kW transmitter : 900c.f.m./1.5" WG

10kW transmitter : 1600c.f.m./1.8" WG

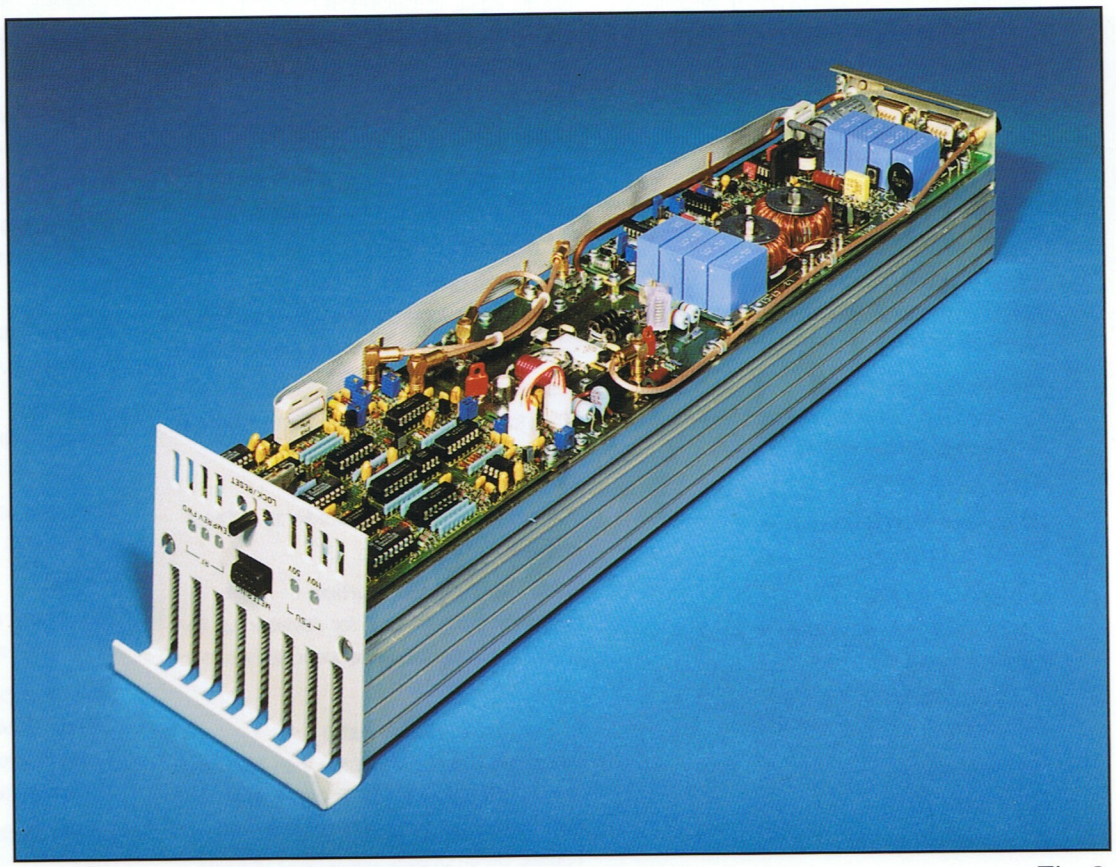

Fig 3

Cooling

The B6600 series transmitters are entirely air cooled by an external air handling system. Air is ducted from the inlet at the top of the cabinet and is directed down the front behind the glazed door. The 300W power amplifier modules are mounted horizontally in the power bank matrix with the fins of heat sink orientated so that the cooling air flows front to rear. Air is then sucked from the front of the matrix to be exhausted from an outlet at the top rear of the cabinet. A comprehensive range of air handling systems is available resulting in most of the noise associated with moving air through a cabinet being contained in an area away from the transmitter; this also avoids the need for seperate plenum chambers or large air conditioning units in the transmitter room.

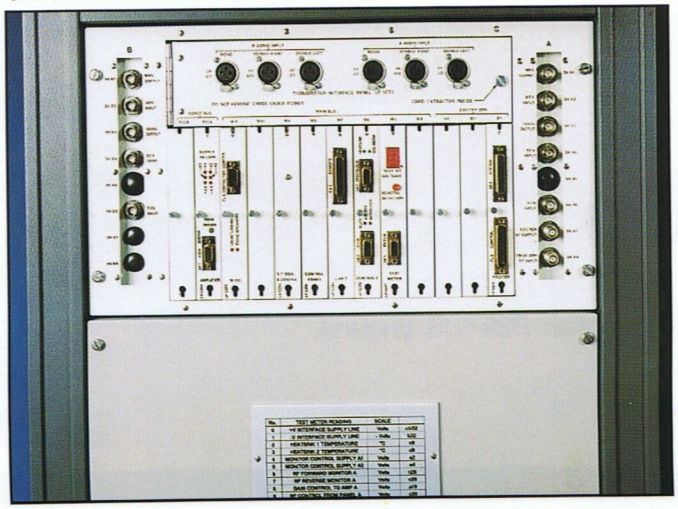

Fig 4

External Interface Connections (Fig 4)

The interface unit at the rear of the transmitter provides the following control and monitoring for at least the following functions

	Control	Indication		Control	Indication
Exciter XE-11			Amplifier		
Supply present		◆	Amplifier Muted	●	◆
Local/Remote	●	◆	RF Power Low (>-2dB)		◆
Pre-emphasis ON/OFF	●	◆	RF Power Fail (>112dB)		◆
Mute/Unmute	●	◆	Mains Contactor	●	◆
SCA On/Off	●	◆	Antenna Interlock	●	
RDS On/OFF	●	◆	Local/Remote	●	◆
Mono/Stereo	●	◆	System Normal		◆
Remote Reset	●		Amplifiers Good		◆
RF power		◆	Driver Status		◆
Audio fail		◆	Control supplies present		◆
Overdeviation		◆	Reverse power normal		◆
Frequency changed		◆			
Lock/Unlock		◆			

Data Summary

Power Output
3kW, 4kW, 5kW,7kW,8kW,10kW,20kW (+0dB to -10dB adjustable)

Operating frequency
Adjustable to any frequency in the range 87.5 to 108MHz in 10kHz increments with the facility for storing information of at least 10 frequency channels which can then be called up remotely. (Dependant on the type of exciter fitted)

Type of Modulation
Modulation F3E/F8E

Stereo Transmission
To CCIR Recommendation 450 Section 2 on pilot tone systems

Frequency Deviation
± 75kHz 100% modulated ± 200 kHz capability) with an overall stability of ± 5% measured over 6 months

RF output load impedance
50 Ohms unbalanced

Maximum VSWR
1.5:1 at full power (protection above this level)
RF output connector (standard) 7/8" EIA : 3kW - 4kW, 1 5/8" EIA: 5kW-20kW

RF harmonics
Better than -70dB

Spurous radiation
Better than -90dB in the range 87.5 MHz to 137 MHz at least 1 MHz removed from carrier.

Carrier frequency stability
± 100Hz measured over 12 months
Centre frequency variation due to modulation ± 300Hz maximum with ± 75kHz deviation

Audio input impedence
600 Ohms balanced or 10k Ohms unbalanced. Return loss not less than 30dB from 40Hz to 15kHz

Audio input level
-2dB or +8dBm, internally selectable or adjustable -6dBm to +8dBm at 400Hz at 100% modulation

Pre-emphasis
50/75µsec, selectable internally or switchable ON/OFF from front panel or by remote signal.

Frequency response (audio)
30Hz to 15kHz ± 0.5dB relative to a level at 400Hz (with or without pre emphasis)
Frequency response (MPX)
30Hz to 53kHz ± 0.2dB, 53kHz to 100kHz ±0.5dB

Total Harmonic Distortion
Less than 0.3% (-50dB) for deviation up to ±75kHz at modulating frequencies between 40Hz and 15kHz

FM signal to noise Ratio
Mono and Stereo : (a) Better than 85dB (typically 90dB) below ± 75kHz deviation at 400Hz measured in a 20kHz bandwidth with 75usec de-emphasis, using RMS detector and 'A' weighted filter.(b) Better than 62dB (typically 64dB) below ± 40kHz deviation at 400Hz with 50µs de-emphasis using quasi-peak detector and CCIR weighting filter.

AM Noise (asynchronous AM s/n ratio)
Better than 0.3% (-50dB) relative to 100% modulated carrier.

Synchronous AM s/n ratio
Less than 0.3% (-50dB) with ± 75kHz deviation at 400Hz with respect to 100% modulated carrier

SMPTE Intermodulation Distortion
Better than 0.05%(-66dB) 60 Hz/7kHz test tones, 4:1 ratio

Sub-carrier suppression
Better than 65dB below composite output level

Stereo Crosstalk
Better than 45dB, 30Hz to 15kHz

Cooling
Forced air from external air handling blower system

Ambient temperature range:
0C to +45C and at an altitude of up to 3000m

Maximum relative humidity
RH of 95% non-condensing

Power supplies
380 to 415VAC (+10% to -15%) three phase, 4 wire plus earth 50/60Hz (+/- 2Hz) (208VAC 3 phase to special order)

Power factor
0.90

Typical Power Consumptions
3kW rf Power Output - 7.1kW
4kW rf Power Output - 9.2kW
5kW rf Power Output - 11.5kW
10kW rf Power Output - 22.5kW

Eddystone Radio

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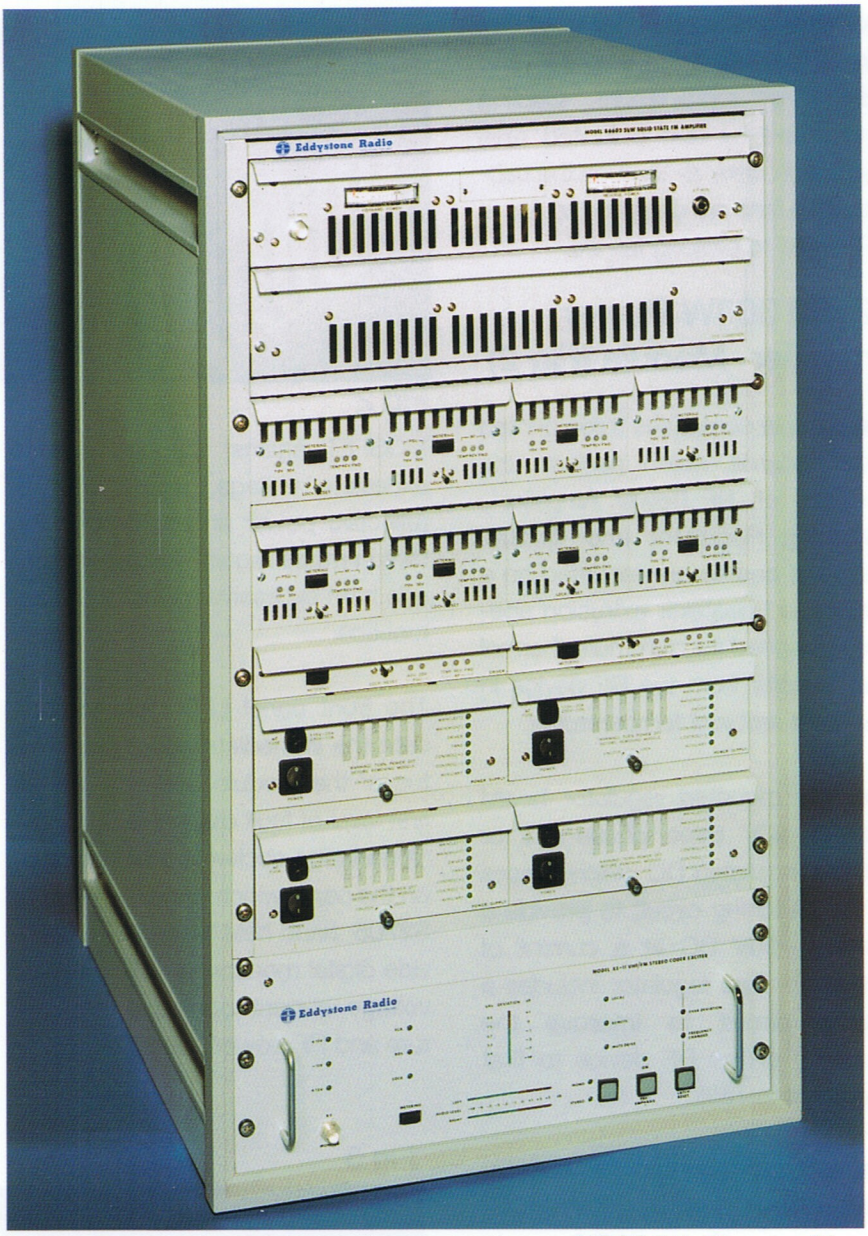
Eddystone Radio

Low Power Solid State FM Transmitter

Features

Eddystone B6600 series of low power Solid State Stereo FM Transmitters include the following features.

- 250W,500W,1000W or 2000W output power
- Broadband 87.5-108MHz with no tuning
- Unique FET control increases device efficiency to a minimum of 60% under worse case conditions (typically 75%)
- Proportional control of power amplifier allowing self restoration after a fault condition
- All solid state using dual sourced FET's and inter-changeable power amplifier modules self protected for open / short circuit , overdrive and over temperature
- Power amplifiers are light weight , easy to handle and can be replaced 'on-air' in less than 10 seconds
- Separate Power supply modules for each pair of power amplifiers
- Comprehensive monitoring facilities
- Integral stereo FM exciter/encoder as standard



B6602/1 Transmitter

General Description

The transmitters compact design is based on a 300W power amplifier module with an advanced highly efficient integrated switched mode power regulator and control circuit. Each module can thus be considered as a complete 'mini-system' only requiring an unregulated DC supply from a modular dual 110V power supplier. A Wilkinson splitter/driver module provides each power amplifier module with it's RF input sourced from the FM exciter. The RF output from each module is then combined in a Wilkinson combiner to give the required power output. Covering the range 250W, 500W, 1000W and 2000W.

Transmitters can be supplied with the Eddystone XE-11 programmable synthesised Stereo Exciter or the SBS FM25 synthesized exciter with MPX5 coder which features overshoot compensation. They can be supplied either in single or dual hot-standby configuration. The B6600 Low Power range can also be supplied in amplifier form for inclusion of the customer's own choice of exciter

provided the unit can produce the required RF drive. (refer to the data summary for RF drive levels for rated transmitter power outputs). The adoption of a 300W power amplifier as the main building brick in the architecture of the B6600 transmitters was two fold. One becase it achieves a gradual failure mode and two because the module's small size and lightweight allows quick and easy 'on-air' replacement. Cooling is provided by rear mounted axial fans which draw air through the cabinet. The fans are designed to run at 2/3 speed to prolong fan life.

S2700 300W Power Amplifier Module (Fig 2)

The module comprises three printed circuit boards which perform the functions of, RF Power Amplifier , Switching Regulator and Control Unit . All boards are mounted on a customised heatsink extrusion specially designed for maximum thermal heat transfer from the RF device in the worst ambient temperatures.

The rear mounted regulator board accepts 80V three phase AC or 110V unregulated DC which passes to the switching circuit to provide a nominal +50V DC at a current of 12Amps . The regulator includes a special circuit to improve the efficiency of the RF device to that approaching 75%.

The centrally mounted RF amplifier board utilises a single 300W MOSFET device with a stabilising gate biasing circuit . An input level of 6W is required to give the rated power output which is fed via an output directional coupler to the control board for monitoring of the forward and reverse power levels. The RF amplifier is broadband matched to give full performance over its 87.5 to 108MHz frequency range without retuning.

The control board, mounted at the front of the module, has the principle function of protecting the RF stage

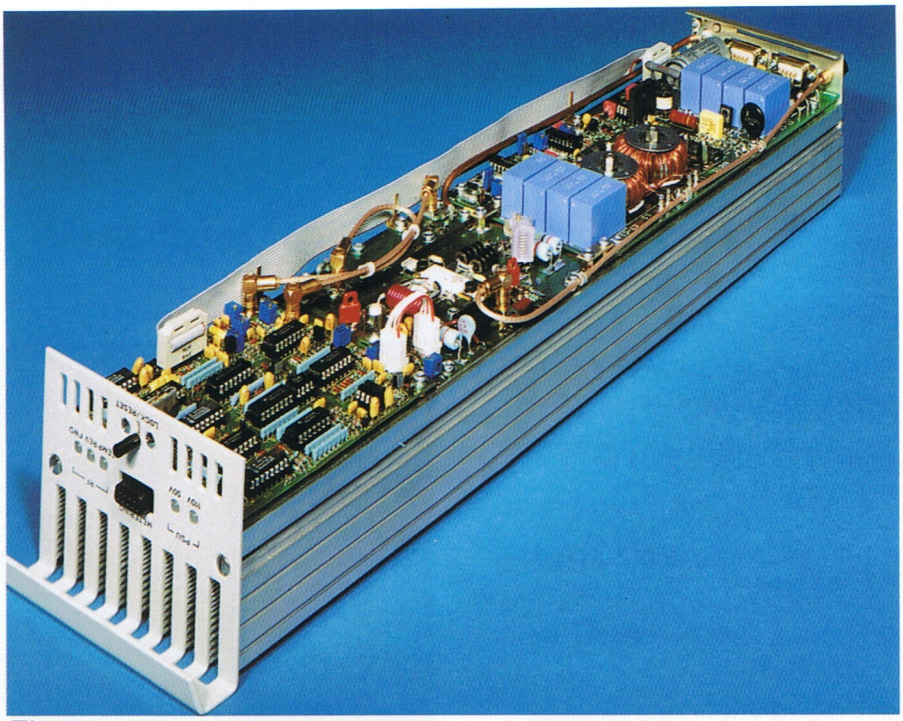


Fig 2

MOSFET against damage due to excessive voltage, temperature or reflective power and to protect the switch mode regulator against damage from excessive mains input fluctuations.

The front panel LED displays indicate the immediate operational status of the module and acts as the first level of fault diagnosis.

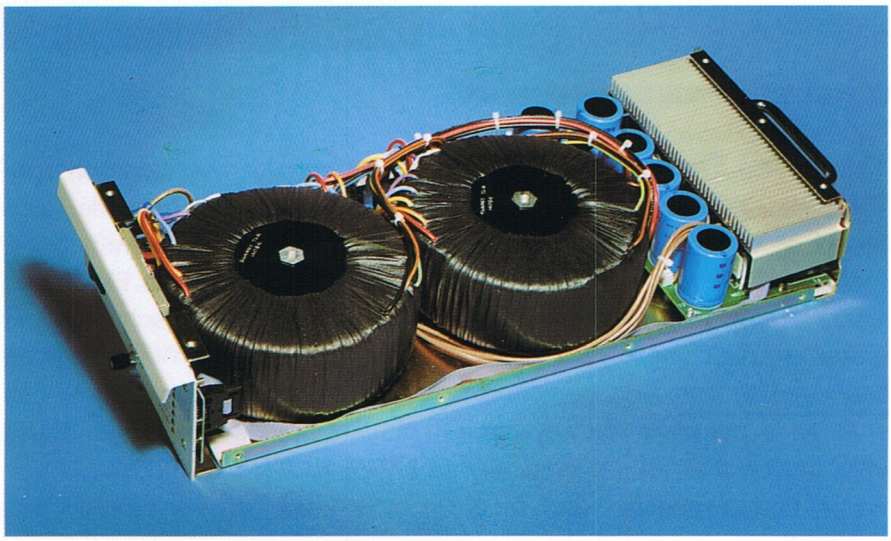
A metering socket is also included on the panel which operates with the S2705 hand held test meter to provide digital monitoring of RFamplifier voltage, current ,operating temperature and RF power output.

LP5446 Power Supply Module (Fig 3)

The power supply module is designed to be incorporated into the B6600 low power range. It provides a number of fused unregulated DC voltage outputs for the operation of the S2700 300W power amplifier modules and are all derived from the secondaries of two toroidal mains transformers (one transformer in the case of the B66003 250W transmitter).

The B66003 250W and the B66005 500W transmitters include one LP5446 power supply , the B6601 1k W two and the B6602 2kW four

Fig 3



power supplies. Seven LED's on the front panel indicate the functional status of each voltage output.

LP5444 Splitter (Fig 4)

The Splitter is designed to be incorporated in the B6601 1kW and B6602 2kW Transmitters and forms the drive amplifier tray in these transmitters. The Splitter accepts a single RF input from an FM exciter and splits it two ways to feed two driver pre-amplifiers. The two outputs from the driver amplifiers are then input to the splitter where they are split either two ways or four ways depending on whether the module is configured for a B6601 or B6602 transmitter.

LP5445 Driver Module (Fig 4)

The driver module is designed to be incorporated in the B6601 1kW and B6602 2kW transmitters.(A driver is not required in the 250W and 500W transmitters). The driver is an RF amplifier gain block which is broadband in the 88MHz to 108MHz FM frequency band. Identical Driver Modules are used in the B6601 and B6602 transmitters. An external connection to the rear of the module automatically selects the output power to be either 15 watts for the B6601 or 35 watts for the B6602 .

LP5447 Output Combiner Module (Fig 5)

Designed to be incorporated in the B6600 low power transmitters. The rear of the module houses a casaded multiway strip-line Wilkinson circuit board which combines the outputs of two, four or eight 300W power amplifier modules depending on the power output requirement of the associated transmitter.

This combiner board also includes harmonic filtering.

The front of the combiner module houses a Monitoring & Control board.

This board provides the signals for measuring Forward and Reverse Power on meters mounted on the module front panel and facilitates AF and RF monitoring.

A potentiometer is also provided on this board accessible on the front panel to adjust the output power of the transmitter. Comprehensive remote interfacing for the transmitter is provided by a 25 Way 'D' connector at the rear of the module.

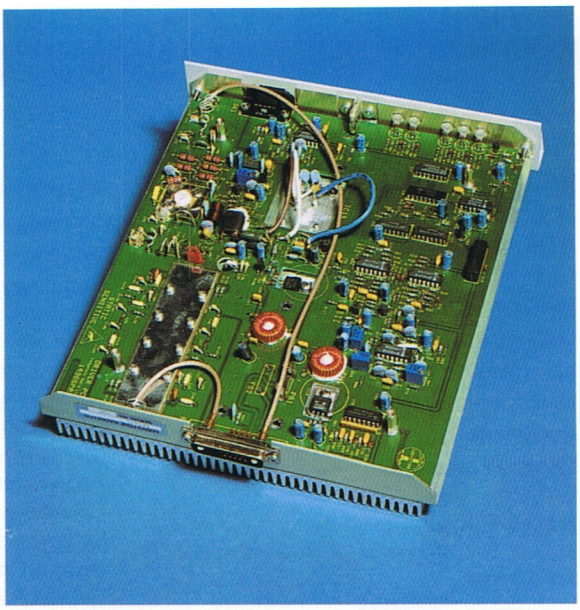


Fig 4

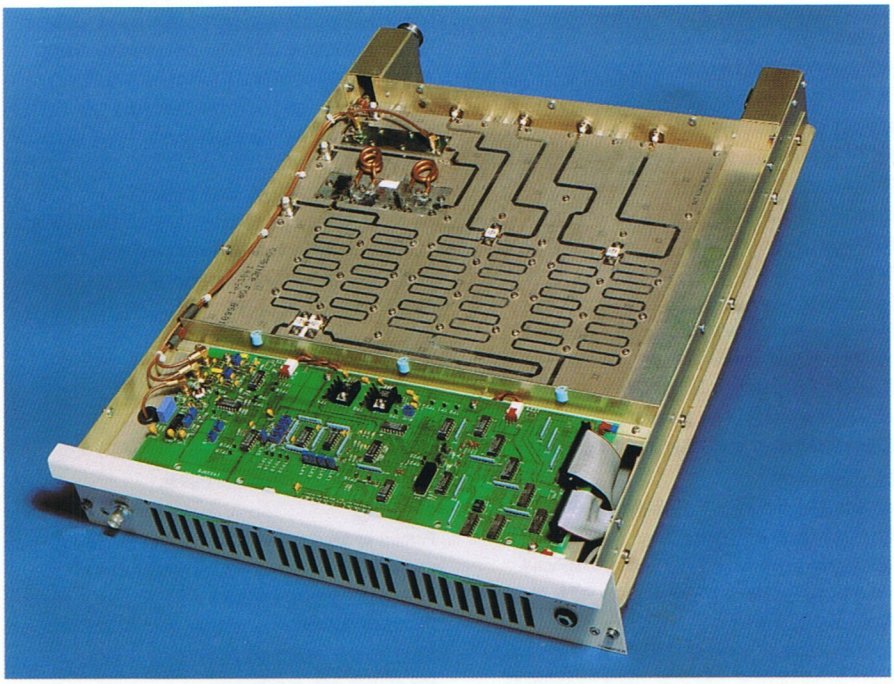


Fig 5

Control and Monitoring

Control and monitoring is available at the transmitter/exciter for at least the following functions

Exciter XE-11	Control	Indication	Amplifier	Control	Indication
Supply present		◆	Supply present		◆
Local/Remote	●	◆	RF Power Low (>-2dB)		◆
Pre-emphasis ON/OFF	●	◆	RF Power Fail (>12dB)		◆
Mute/Unmute	●	◆	REV Power OK		◆
SCA On/Off	●	◆	Combiner over		◆
RDS On/Off	●	◆	temperature		◆
Mono/Stereo	●	◆	General cooling fault		◆
Remote reset	●		System Normal		◆
RF power		◆	Amplifiers Status		◆
Audio fail		◆	Driver Status		◆
Overdeviation		◆	Control supplies good		◆
Frequency changed		◆	Reset latch	●	
Lock/Unlock		◆	Mute	●	
			Interlock	●	
			Indicator disable	●	
			Amplifier Muted	●	

Data Summary

Power Output
250W, 500w, 1kW (0dB to -10dB adjustable)

Operating Frequency
Adjustable to any frequency in the range 87.5 to 108 MHz in 10 kHZ increments with the facility for storing information of at least 10 fequency channels which can then be called up remotely . (Dependent on the type of exciter fitted)

Type of Modulation
Modulation F3E/F8E

Stereo Transmission
To CCIR Recommendation 450 Section 2 on pilot tone systems

Frequency Deviation
± 75kHz 100% modulated (± 200kHz capability) with an overall stability of ± 5% measured over 6 months

RF output load impedance
50 Ohms unbalanced

Maximum VSWR
1.5 : 1 at full power (protection above this level)

RF output connector
(standard) 7/ 16 DIN.

RF harmonics
Better than - 70dB

Spurious Radiation
Better than -90dB in the range 87.5 MHz to 137MHz at least 1MHz removed from carrier.

Carrier Fequency Stability
± 100Hz measured over 12 months

Centre Fequency Variation due to Modulation
± 300 Hz maximum with ± 75 kHz deviation

Audio input impedance
600 Ohms balanced or 10k Ohms unbalanced. Return loss not less than 30 dB from 40Hz to 15kHz

Audio input level
-2dB or + 8dBm , internally selectable or ajustable - 6dBm to +8 dBm at 400Hz at 100% modulation.

Pre-emphasis
50/75 usec, selectable internally or switchable ON/OFF from front panel or by remote signal.

Frequency response (audio)
30Hz to 15kHz ± 0.5dB relative to a level at 400Hz (with or without pre-emphasis)

Frequency response (MPX)
30Hz to 53kHz ± 0.2dB,
53kHz to 100kHz ± 0.5dB

Total Harmonic Distortion
Less than 0.3% (-50dB) for deviation up to ±75kHz at modulating fequencies between 40Hz and 15kHz

FM signal to noise Ratio
Mono and Stereo : (a) Better than 85dB (typically 90dB) below ± 75kHz deviation at 400Hz measured in a 20kHz bandwidth with 75µsec de-emphasis, using RMS detector and 'A' weighted filter . (b) Better than 62dB (typically 64dB) below ±40kHz devation at 400Hz with 50µs de-emphasis using quasi peak detector and CCIR weighting filter

AM Noise (asynchronous AM s/n ratio)
Better than 0.3% (-50dB) relative to 100% modulated carrier.

Synchronous AM s/n ratio
Less than 0.3% (-50dB) with ±75kHz deviation at 400Hz with respect to 100% modulated carrier

SMPTE Intermodulation Distortion
Better than 0.05%(-66dB)
60Hz/7kHz test tones, 4 : 1 ratio

Sub-carrier suppression
Better than 65dB below composite output level

Stereo Crosstalk
Better than 45dB, 30Hz to 15kHz.

Cooling
Forced air from multiple internal axial DC fans operated at approximately 2/3 speed.

Ambient temperature range:
0°C to +45°C and at an altitude of up to 2500m

Maximum relative humidity
RH of 95% non-condensing

Power supplies
115 or 230V (+10% to -15%) single phase 50/60Hz (+/- 2Hz)

Power factor
0.80

Power effciency
Typically 50% including exciter.

RF Drive for rated power output
B66003 - 6 watt
B6601 - 6 watt
B66005 - 12watt
B66002 - 6 watt

Input VSWR or return loss (amplifier)
1.67 : 1 or 12dB

Model Variants
-/1 Line fed single exciter
-/2 Line fed dual exciter with auto changeover
-/3 RBL fed single rebroadcast RX/Drive
-/4 RBL fed dual rebroadcast RX/ Drive with auto changeover
-/5 Amplifier only (no exciter)
-/6 Dual RBR fed, dual exciters
-/7 Active Reserve Line fed
-/8 Passive Reserve Line fed
-/9 Line fed single exciter two amplifiers
-/10 Amplifier sub assembly only (no cabinet)
-/11 Line fed two exciters, two amplifiers
-/12 Line fed Mono exciter

Suffix Variants available on all models above
/m MPX only (no stereo coder)
/v FM25 FM Exciter
/s Special Cabinet - eg /S (25) = 25U cabinet
/w FM25 exciter + MPX5 coder with overshoot compensation

Weights and dimensions (approximate in millimetres)
Fitted in standard 19ins cabinet, -/1 versions with XE-11 Exciter
B66003-H488,W550, D645 Weight - 103kg
B66005 - H488,W550,D645 Weight- 110kg
B6601-H577,W550,D645 Weight-152kg
B6602-H889,W550,D645 Weight - 178kg

Dual EX -11 exciter versions (-/2) adds the following dimensions/ weight
H222mm Weight 26kg

Eddystone

Eddystone Radio

A GEC-MARCONI COMMUNICATIONS COMPANY.

Eddystone Radio Limited, Unit 8/9 Birkdale Avenue, Selly Oak, Birmingham B29 6UB, England.
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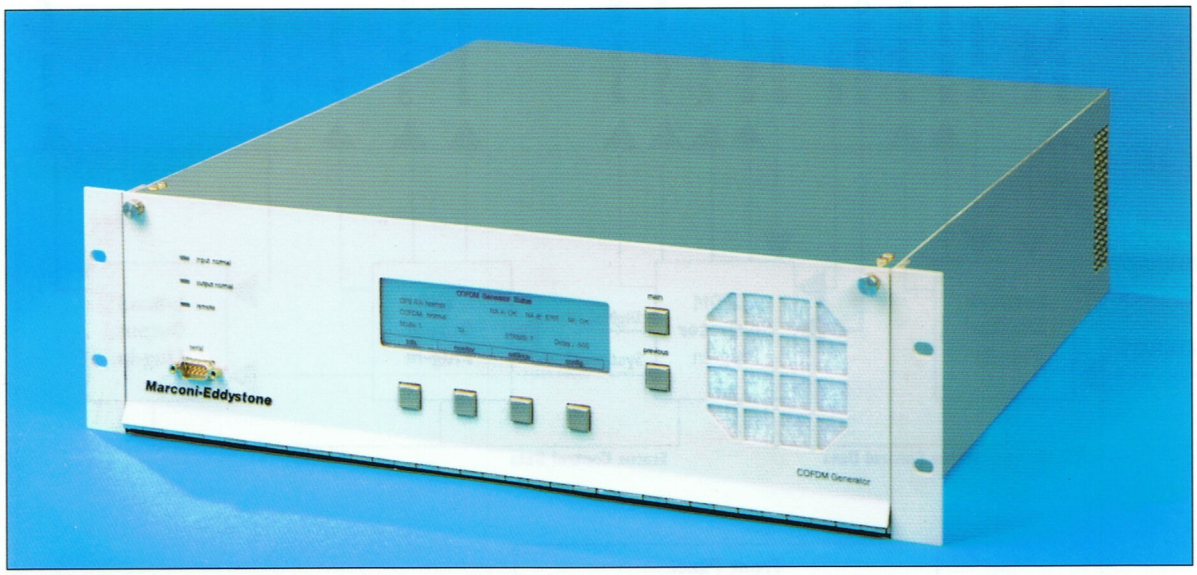
Eddystone

DAB systems

B6800 DAB COFDM GENERATOR



FEATURES

- Fully compliant with ETS 300 401, including Mode IV.
- 2Mbit/s ETI (V4.1) inputs (NI or NA) with network delay management for use in Single Frequency Networks.
- Outputs available at 'baseband I/Q' (analogue and digital), IF, Bands I, II, III or L-band.
- Synthesised or Fixed-frequency options available.
- Comprehensive, menu-driven, programming and monitoring facilities.
- Compact 3U design.
- 'Future-proof' dsp-based COFDM generation.

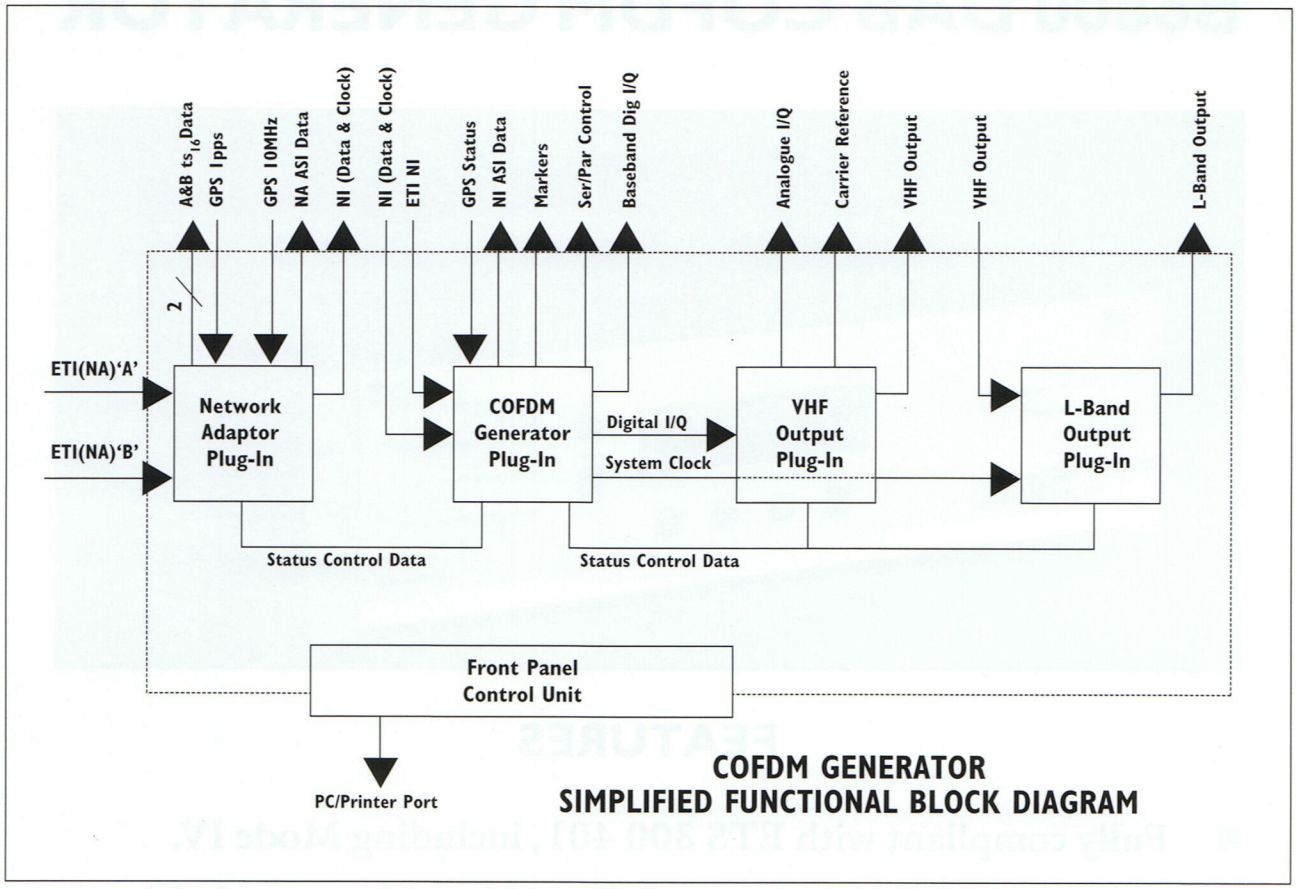
GEC-Marconi
Communications
Broadcast

Marconi House, New Street, Chelmsford, Essex CM1 1PL, United Kingdom. Tel: (0) 1245 353221 Facsimile: (0) 1245 287125

DESCRIPTION

INTRODUCTION

The Marconi-Eddystone B6800 DAB COFDM Generator is the first in a new generation of DAB equipment. Developed in conjunction with BBC Research & Development, its flexible, yet compact, design makes it the world-leader in DAB COFDM technology. The 3U chassis houses up to four plug-in modules, providing the flexibility to generate DAB signals in any application.



COFDM GENERATOR
SIMPLIFIED FUNCTIONAL BLOCK DIAGRAM

COFDM GENERATOR PLUG-IN

The heart of the unit is the COFDM Generator plug-in, which converts a 2Mbit/s Ensemble Transport Interface signal into a digital I/Q output. All signal interfaces are fully compliant with the latest ETSI and EUREKA DAB specifications (ETS 300 401, ETI V4.1 etc.).

Based on powerful dsp technology, the equipment can generate all DAB modes, including Mode IV. Even future revisions of the specification, such as the inclusion of new sub-channel error profiles, will pose no problems for the B6800 as this can be dealt with by upgrading plug-in firmware. There is even provision for doubling the amount of processing power fitted to the card.

The inherently low processing delay of the COFDM Generator plug-in minimises the consequences of delay build-up in a DAB network. The delay can be adjusted to match the longer processing delays of other units if necessary.

The adjustable delay also allows any differential distribution delays in a SFN to be corrected and the local offset delay of any transmitter can be adjusted to optimise the coverage of the network. The local offset delay is adjustable, along with the TII code, via a signalling channel carried within the 2Mbit/s input signal allowing all the information which is unique to a transmitter to be stored and set from a centrally-held database.

Comprehensive monitoring of the system is also provided by the COFDM Generator plug-in. This is accessed via the front-panel LCD screen and the associated ‚soft‚ push-buttons. All the features of the system are controlled via this screen including a historical log of status information. Remote control may be achieved through a number of serial ports.

Test options, again controlled by a front-panel menu, allow fixed data patterns or random data sequences to be inserted in any stream, the FIC or the full DAB frame. A block of carriers may also be deleted to assist with identifying any in-band problems. The size of the deleted block is adjustable.

NETWORK ADAPTER PLUG-IN

The Network Adapter is required when using distribution networks with variable delay and is recommended even in single-transmitter applications. Timestamps, carried by the ETI(NA) inputs, permit the Network Adapter to correct any variation in distribution delay. The timing of the signal is restored with respect to a locally generated time reference which is most easily provided by an external GPS receiver.

A powerful Reed-Solomon code allows network errors to be corrected. Two ETI(NA) inputs are provided and the unit makes an automatic selection of the best input at up to 1000 times a second. Selection may also be locked when only one input is available, or for maintenance purposes.

Monitoring of the behaviour of the distribution network is also provided. Error statistics for the inputs (using parameters similar to G.821) are maintained and can be inspected via the fault log maintained by the COFDM generator plug-in.

Either variant of the ETI(NA, 1) defined in the Eureka specification can be used. Selection is by front-panel menu control.

VHF OUTPUT PLUG-IN

The VHF Output plug-in converts the digital I/Q output of the COFDM Generator into a modulated RF signal.

Versions of this card are available which can provide outputs at any frequency – analogue baseband I/Q, IF, or Bands I, II or III.

Fixed-frequency options provide the lowest cost option in SFN applications. Synthesised versions are also available and may be integrated into 'N+1' systems. The output frequency may be locked to an external reference to satisfy the precise requirements of an SFN for centre-frequency accuracy. The frequency standard is most readily derived from the GPS receiver used to provide the time reference.

L-BAND CONVERTER PLUG-IN

The L-band Converter is used to convert the output of a VHF Output plug-in to L-band. The L-band conversion frequency may also be locked to the frequency reference in order to provide an accurate centre-frequency.

GENERAL

A front-panel back-lit LCD, together with a number of 'soft' keys provides menu-driven configuration and status information. Three LEDs provide a status overview. Rear-panel connectors allow access to a number of remote status and monitoring lines including marker pulses for each symbol, frame and frame 0 for checking the time synchronization of the network.

SPECIFICATIONS (PROVISIONAL)

COFDM GENERATOR PLUG-IN

HDB-3 In:	2Mbit/s, HDB-3 input conforming to the Eureka ETI(NI) specification (V4.1). BNC connector with 75Ω/ Hi-Z input impedance set by link.
Data/Clock:	Alternative Data/Clock input for ETI(NI) data. 9-pin D connector, RS-422 levels.
NI ASI:	Output for unused NI-layer data. Details can be supplied on request.
Output markers:	Marker pulses for symbol start, frame start and frame_0 start, 9-pin D, o/collector outputs.
Digital baseband I/Q:	Digital baseband I/Q output conforming to Eureka specification.

NETWORK ADAPTER (NA) PLUG-IN

Input A:	2Mbit/s, HDB-3 input conforming to the Eureka ETI(NA, 1) specification (V4.1). BNC connector with 75Ω /Hi-Z input impedance set by link.
Input B:	As above.
Time epoch:	1pps, TNC, TTL levels. One second epoch marked by rising edge.
Timecode:	Serial timecode and GPS status information. 9-pin D connector. Details of format accepted can be supplied on request.
NI out:	2Mbit/s output (data & clock). 9-pin D connector, RS-422 levels. Data corresponds to NI data recovered from Inputs A & B.
ts16 out A:	64kbit/s timeslot 16 data. 9-way D connector, Bi-directional data & clock for timeslot 16 monitoring.
ts16 out B:	As above.
NA ASI:	Output providing access to NA layer 'M' and 'S' bytes recovered from aggregate datastream. 9-way D connector. RS-232 levels. Allows external monitoring of bytes and use of unallocated capacity. Details of format can be supplied on request.
Freq. Ref:	10MHz, BNC, +7dBm typ. Reference signal input which locks the system clock frequency to the external reference.

VHF OUTPUT PLUG-IN

I/Q(b/band):	9-pin D connector, +10.5dBm mean power. Analogue baseband I/Q output.
Ref. carrier:	TNC 50Ω, +14dBm output. Unmodulated carrier signal. Frequency range to order.
VHF output:	TNC 50Ω, 0dBm nom. Modulated output at selected frequency. Frequency range to order. Output frequency is locked to system clock.

L-BAND PLUG-IN

VHF Input :	TNC 50Ω, 0dBm nominal. Normally looped to VHF Output connector.
Output:	SMA 50Ω, output power tba.

REMOTE MONITORING INTERFACES

Control Serial Interface:	9-pin D connector. RS-232 levels. Serial port allowing the unit to be interfaced to external control equipment. Details of the protocol can be provided on request.
Parallel Monitoring Bus:	25-pin D connector. Opto-isolated inputs and outputs. Parallel status outputs and control inputs. Full details can be provided on request.
PC/Printer Interface:	9-pin D connector (on front-panel), RS-232 levels. Serial port allowing system control or monitoring applications. Full details of the protocol can be provided on request.

GENERAL

Power :	90-264Vac, 48-63Hz, IEC connector
Temp range:	–10 to +45°C (+50°C for up to 12 hours in any 24 hour period).

PERFORMANCE

Processing delays (measured in Mode II/III from start of input frame to start of output frame).

COFDM PLUG-IN:

< 48 ms

Network Adapter Plug-in:

< 50 ms

VHF Output Plug-in:

< 12 ms

ADJUSTABLE DELAY RANGE

COFDM Plug-in :	> 500 ms in 488 ns steps.
Network Adapter Plug-in:	Network delay padded to a value between 100-1000 ms in 1ms steps.

OUTPUT SPECTRUM

(measured on analogue I/Q outputs)

DC offset:	± 3mV
Spurious :	< –42 dB, 968-2250 kHz
	< –57 dB, 2.25-10MHz
	< –66 dB, 10-1000MHz

The above description and data summary are subject to change and are not to form part of a contract.