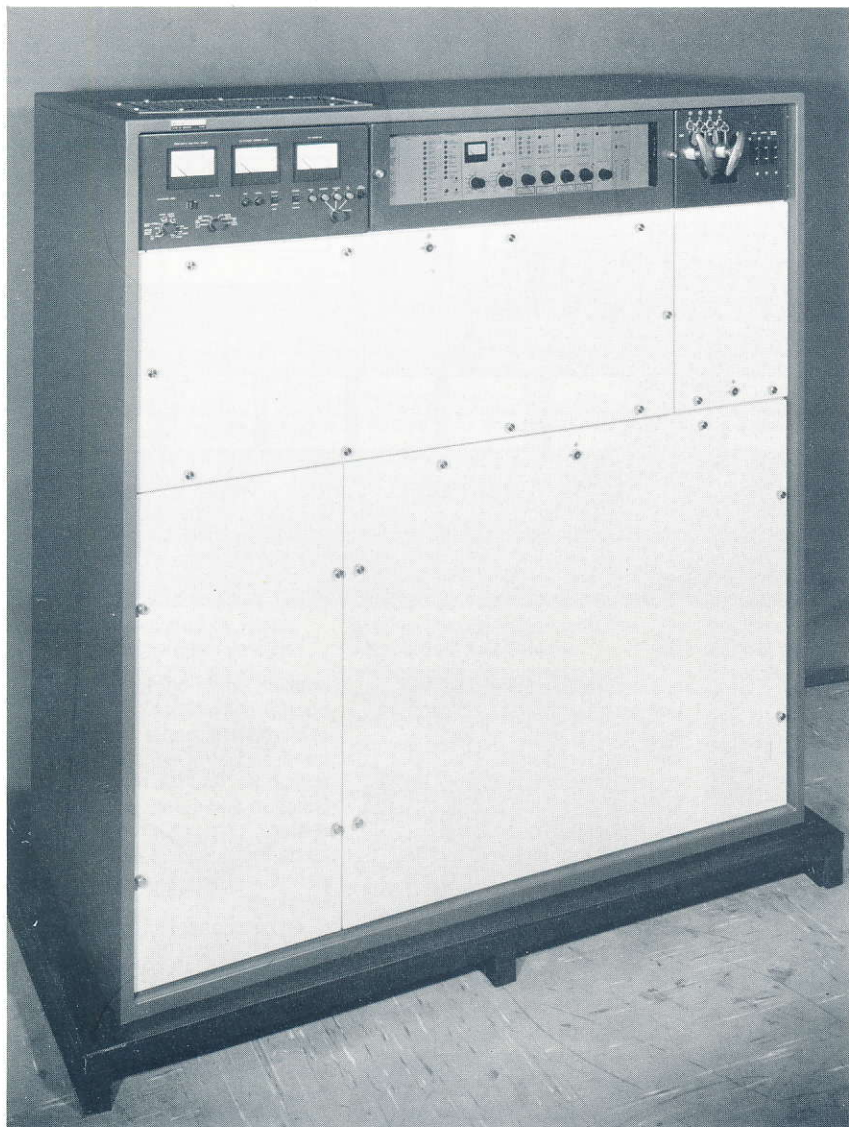


## 10kW Auto Tune Linear H.F. Amplifier



### Features

- 10kW c.w or p.e.p from 1.6MHz to 30MHz
- Self-contained and exceptionally compact
- Suitable for container installation
- Internal supply regulation
- Front access only required for ease of servicing and maintenance
- Frequency following automatic tuning. Tuning time typically 2 to 3 seconds
- Automatic level setting on tuning
- Remote and extended control

### Description

#### General

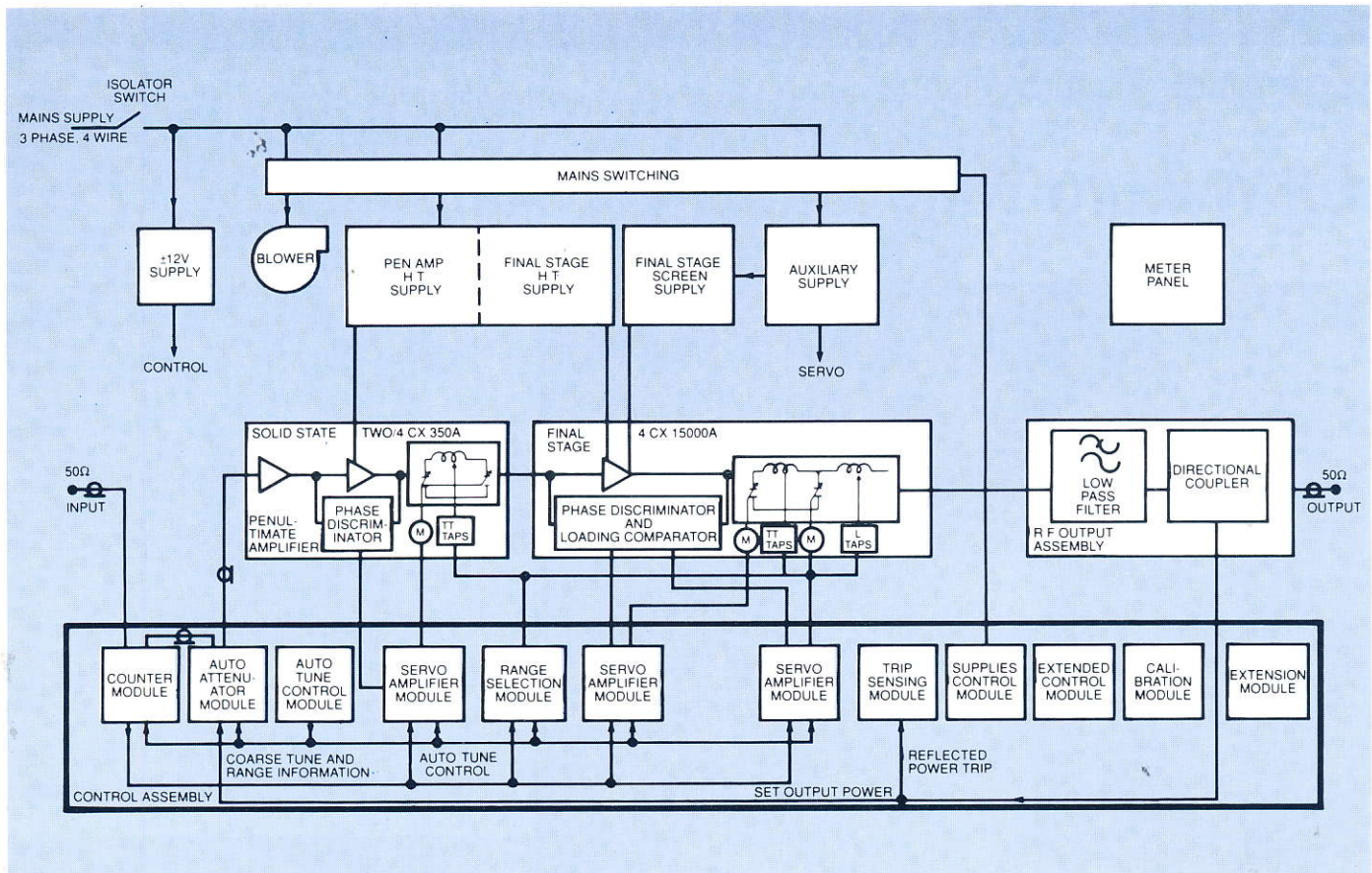
The H1141 is a fully automatic linear h.f amplifier, suitable for use by military or civil authorities in either fixed station or transportable roles.

The H1141 provides an output of 10kW mean or peak envelope power over the frequency range 1.6MHz to 30MHz. An input at radiated frequency, of any level between 50mW and 150mW (or 1W to 2W with internal attenuator) will drive the amplifier to full power. All normal modes of emission are acceptable. The amplifier will tune to any frequency within the stated range in typically 2 to 3 seconds, the output being terminated in a nominal 50Ω load with a v.s.w.r of not worse than 3:1

The amplifier consists of a wideband solid state input stage, a tuned penultimate stage and a tuned p.a stage. Variable controls are designed to have a minimum of moving parts for maximum reliability.

A fully integrated digital control system is incorporated on standard size plug-in printed boards, housed in a standard shelf. All control functions, such as power switching and sequencing, range determination, servo control, overload protection and indication are contained in this single shelf.

The overall system is simple in concept and highly reliable. Power supply circuits employ silicon rectifier diodes together with high quality transformers and chokes.



Overall cooling is provided by a single centrifugal fan mounted internally.

When used with a Marconi Drive – housed separately – the equipment fully complies with the relevant C.C.I.R recommendations concerning intermodulation distortion, spurious harmonic emissions and modulation, as well as the ITU Radio Regulations pertaining to frequency accuracy and stability.

### Mechanical

The amplifier is housed in a single cabinet of modern design and appearance. It is suitably dimensioned to allow installation in transportable containers without modification.

The cabinet basically comprises three compartments. The lower compartment houses the heavy power supply components, the cooling fan and the penultimate stage. The latter

is a completely self-contained unit which withdraws on runners and may be removed for servicing if required. The compartment immediately above is occupied by the r.f. output stage components. These are so arranged that all servo motors, control wiring and inductance switching mechanisms are mounted in adjacent compartments to isolate them from the r.f. environment. The

smaller, upper compartment houses the integrated control system shelf, panel mounted meters, control switches and indicators, and the mains isolation and safety interlock system. This system ensures that all dangerous voltages are earthed before access can be obtained.

All components are readily accessible from the front for ease of maintenance and servicing.

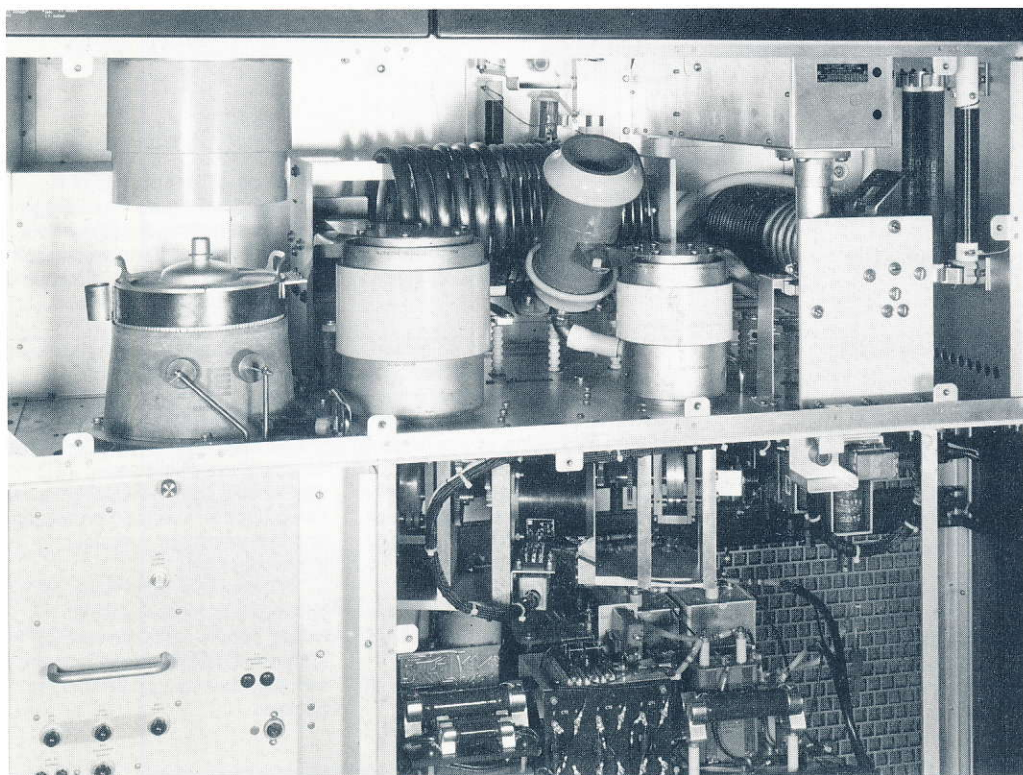
### R.F. circuits

The amplifier comprises a low level, wideband solid-state input stage which drives a tuned penultimate stage where two 4CX 350A ceramic tetrodes are operated in parallel. The penultimate stage drives the p.a. stage via a servo-driven coupling circuit. The p.a. stage uses single 4CX 15000A ceramic tetrode, the tuning and loading arrangements consist of a pi-L configuration using variable ceramic vacuum capacitors and switched inductors. A unique electro-mechanical system ensures fast tuning response times and a high standard of reliability.

A directional coupler in the output circuit provides indication of forward and reflected power on a front panel meter. Control information for output level setting and v.s.w.r. trip is also derived from the directional coupler. A high value of reflected power will initiate a fast acting trip circuit to protect the amplifier from mismatches which may occur at the output feeder.

### Auto-tuning system

The auto-tuning system measures the incoming



Final stage components

frequency from the drive. This information is processed and used to provide 'range' and 'coarse level' settings to all tuned stages simultaneously. Fine tuning is achieved by the use of phase comparators in both the penultimate and p.a stages. Final loading is accomplished by a loading comparator.

Information derived from the directional coupler adjusts an input auto-attenuator to give final level setting of 10kW.

### Manual tuning

The appropriate coil taps may be selected and variable capacitor adjusted manually. A range switch selects the coil taps and potentiometers control the capacitors.

### Power supply circuits

Power supply circuits utilize air-cooled transformers and silicon rectifiers throughout.

Final and penultimate H.Ts are derived from the same transformer. Current transformers provide overload protection and a voltage suppressor protects the rectifiers.

Primary protection is provided by circuit breakers, primary switching is by contactors. Secondary protection where necessary is provided by fuses.

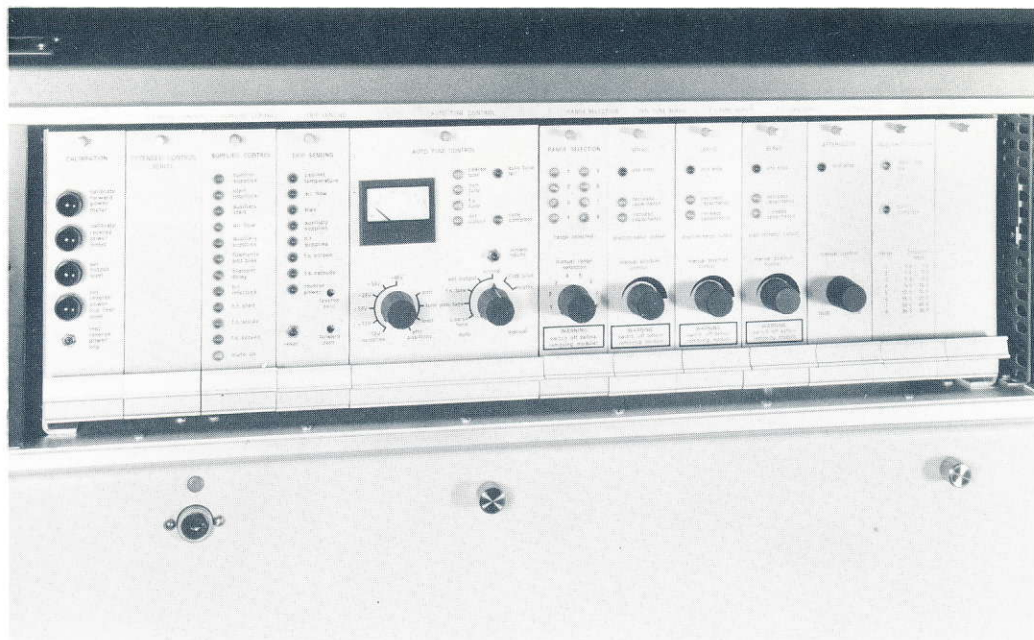
The following protective trips are all subject to a 'three shot restoration' system:

- 1) H.T supplies
- 2) Final stage cathode current
- 3) Final stage screen current
- 4) Bias failure
- 5) Air failure
- 6) Excessive reflected power
- 7) Auxiliary supply failure
- 8) Excessive cabinet air temperature.

Should three such trips occur within one minute a 'lockout' condition is applied which necessitates deliberate action to reset.

Individual indication is provided for each trip.

The transmitter maintains performance with mains variations



Control assembly

of between +6% and -10% of the nominal. Critical voltages are regulated by an internal automatic voltage regulator.

### Remote Extended Control

When used for remote/extended control in conjunction with the Marconi H1542 Drive a microprocessor-based control module is programmed to respond to commands from the control point which are fed via the drive. The module also sends reverte data back to the control point via the drive. A standard V24/V28 interface connection is used at the amplifier and the drive. The same control panel is used for both Extended and Remote Control.

Control can be extended up to 100m over lines using the V24/V28 interface.

Remote control over telephone lines or microwave links is achieved by the use of standard low speed modems. Control of a single equipment requires 110

baud modems only.

For multiple equipment systems, standard data multiplex and modems are employed.

A number of configurations are possible. In dedicated control, each transmitter drive combination has its own remote control panel and can be controlled individually at any time. If changes are not required simultaneously, one panel can control a number of equipments via a simple selector switch unit. If required, display panels are available to provide a continuously up-dated display of equipment status.

Provision has also been made to combine other elements of Marconi processing equipment with the remote control system to provide fully automatic control of a complete station.

**Where the amplifier is used with other drive equipments, a simple clean contact interface is provided for remote and extended control.**

## Data Summary

### Frequency range:

1.6MHz to 30MHz.

### Output power:

10kW p.e.p.  
10kW mean.

### Load impedance:

50Ω unbalanced.  
V.S.W.R up to 3:1.

### Output connector:

1<sup>5</sup>/<sub>8</sub> in E.I.A. flange.

### Harmonic and spurious emissions:

Less than 50mW.

### Non linear distortion:

All intermodulation products better than -36dB relative to either of two equal test tones, at any level up to full p.e.p.

### Input impedance:

50Ω unbalanced.  
Max v.s.w.r 1.5:1.

### Input level: 50mW to 150mW.

An internal attenuator is fitted and may be inserted where drive levels of 1W to 2W are required to be used. Input must be at required radiated frequency.

### Frequency change time:

5s maximum.

Resetting accuracy: ± 0.5dB.

### Monitoring:

R.F monitor points are provided at the input to each stage and the final output.

### Power supplies:

380 – 440V ± 10%.  
3 phase 4 wire a.c 50Hz ± 3Hz  
(60Hz ± 3Hz version available).

### Power consumption:

21kVA for 10kW p.e.p.  
28kVA for 10kW mean.

### Environmental conditions:

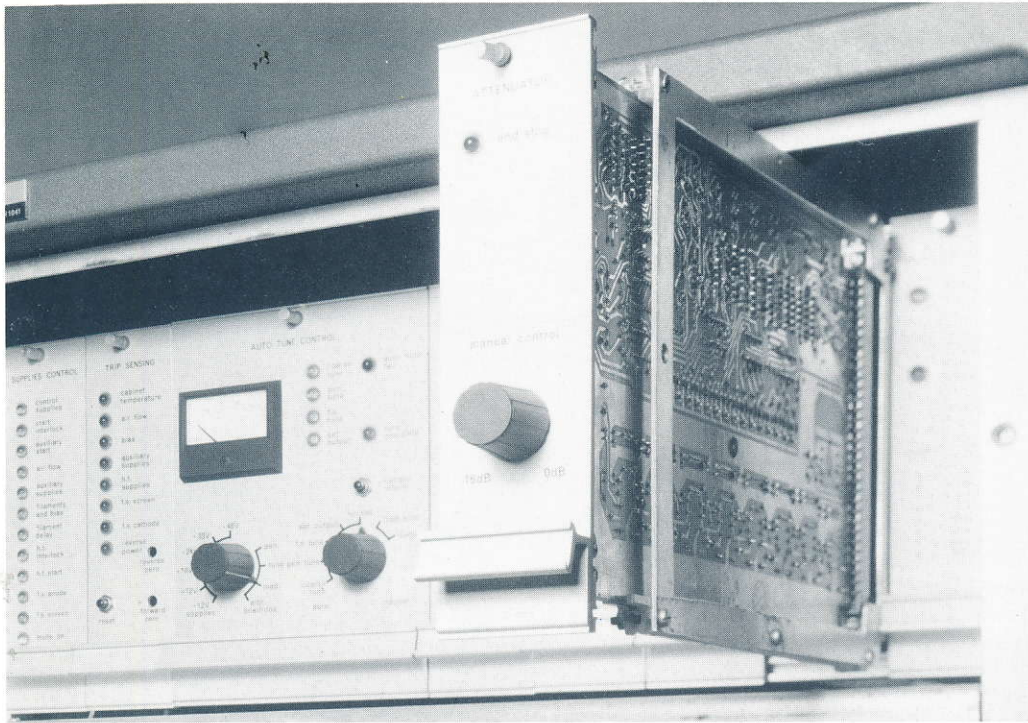
- 1) Temperature: -10°C to +55°C.
- 2) Relative humidity: 95% at 40°C.
- 3) Temperature range at 2000m -10°C to +50°C.

For operation above 2000m a booster fan is required to maintain temperature range.

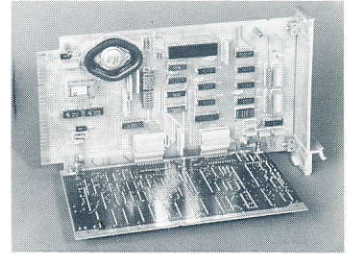
### Dimensions:

Height: 1.6m (5ft 3in)  
Width: 1.5m (4ft 11in)  
Depth: 0.70m (2ft 3<sup>1</sup>/<sub>2</sub>in)  
Weight: 700kg.

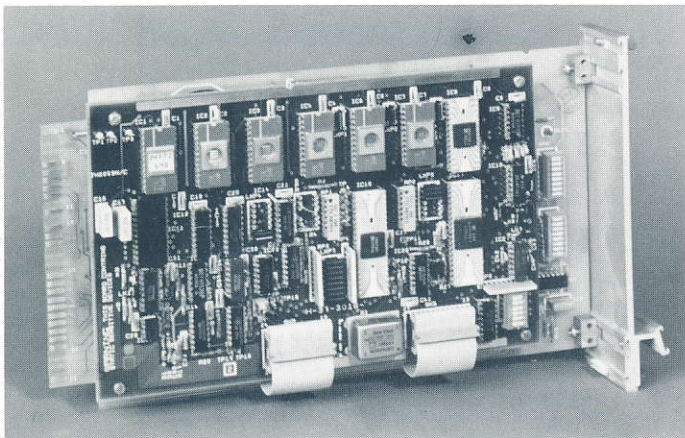
For information on the Marconi Synthesized Drive Equipment see TD-H1542



Control modules, one extended for servicing



Microprocessor Remote/Extended Control Module hinged for servicing



Microprocessor Remote/Extended Control Module

# Marconi

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TD-5-H1141