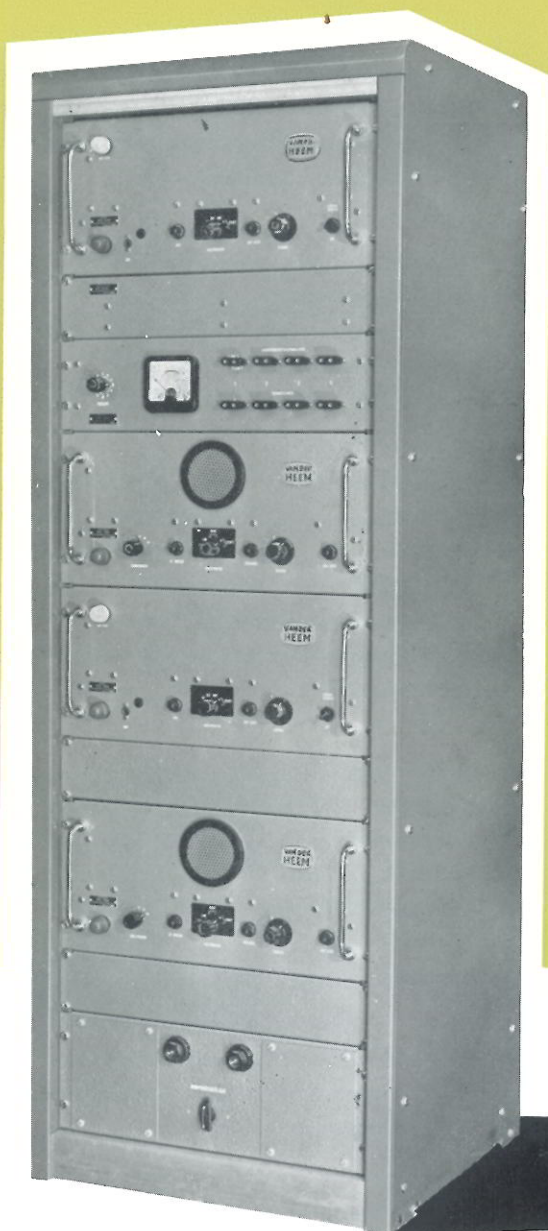


Transmitting and Receiving Equipment for Base Stations

VAN DER HEEM N.V. - THE HAGUE - HOLLAND



Complete Transmitter/Receiver Installation

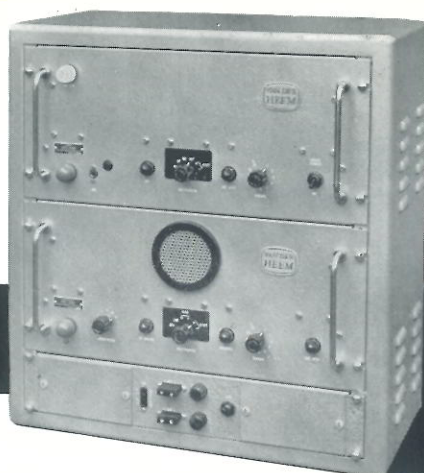
consisting of:

- 2 Receiver Units HTC 1105
- 2 Transmitter Units HTC 1205
- 1 Measuring Panel HTC 1808
- 1 Junction Panel HTC 1807
- 2 Duplex Filters HTC 4521

Simple Transmitter/ Receiver Installation

consisting of:

- Transmitter Units HTC 1205
- Receiver Unit HTC 1105
- Junction Panel HTC 1810





Transmitting and Receiving Equipment

for

Base Stations

The Van der Heem transmitters and receivers for base stations are suitable for simplex, semi-duplex and duplex operation with frequency modulation in the 156-174 Mc/s band.

Up to 12 channels can be chosen.

The transmitters and the receivers are separate units. If necessary one transmitter and one receiver can operate on a common aerial, i.e. for simplex and semi-duplex operation by means of an aerial relay and for semi-duplex and duplex operation by means of a duplex filter.

Two types of distribution amplifier have been designed to make possible the operation of up to six receivers on one aerial.

When a larger transmitter output is wanted the 50/70 watt power amplifier HTC 1806 is available, which can also be operated together with the receiver HTC 1105 on a common aerial.

The audio (telephone) lines and switching (telegraph) lines and the mains are wired to the junction panel. From this panel cables with plugs connect to the transmitters and receivers.

This makes the interchanging of units very simple.

A test points selector switch is installed on the transmitters and receivers. By means of a panel selector switch on the HTC 1808 the panel to be tested (HTC 1205 or 1105) can be connected to the meter on the HTC 1808 and thus any of these test points of the receiver or transmitter can be connected to the meter on the test panel to be checked.

Other test points can be measured by means of a moveable test pin which is present inside the transmitter and receiver.

The units are designed to be mounted into a standard 19-inch rack or cabinet.

The transmitter and receiver units are provided with sliding runners with a stop.

By means of this construction it is possible to pull the units out, or to remove them entirely from the cabinet, e.g. for maintenance.

Each transmitter or receiver is provided with a built-in power unit.

VHF-Receiver HTC 1105



The receiver can be operated with a maximum of 12 crystal-controlled channels within a band of 7 Mc/s in the frequency range 156-174 Mc/s. The selection of 11 channels is effected by means of a switch on the front panel, whereas at a distance the choice between two channels can be carried out by means of the built-in relay.

The output transformer is provided with a specially matched winding for connexion to telephone lines. The level can be adjusted at 1 mW across 600 ohms.

The receiver has a relay for signalling when signals are coming in. The above features make this receiver very suitable for operation from a great distance. Pre-set adjustments of the aerial circuit, the muting threshold and the output level are provided on the front panel. They are protected by screw caps.

The output level of the loudspeaker, which is mounted on the front panel, can be adjusted in steps independent of the line output level.

VHF-Transmitter HTC 1205



The transmitter can be operated with a maximum of 12 crystal-controlled channels within a band of 2.5 Mc/s in the frequency range 156-174 Mc/s.

The selection of 11 channels is effected by means of a switch on the front panel, whereas at a distance the choice between two channels can be carried out by means of the built-in relay.

The output is 8 watts + of - 1 dB, and therefore the HTC 1205 can be used as an independent transmitter or as driver unit for the 50/70 watt power amplifier HTC 1806.

The audio input transformer has a specially matched 600 ohm winding for connexion to telephone lines and a 150 ohm winding for local operation from the front panel.

The operation of the transmitter is very simple and can be effected through telephone or telegraph lines from a distance.

Pre-set adjustments of the aerial circuit and of the input sensitivity are provided on the front panel; they are protected by screw caps.

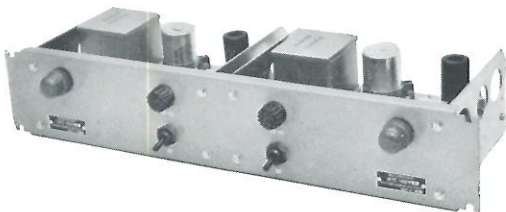
VHF Power Amplifier, 50/70 watts HTC 1806



This power amplifier can be connected to the VHF-transmitter HTC 1205 without having to use separate switching lines. The HTC 1205 puts the power amplifier into operation when driving it with RF power.

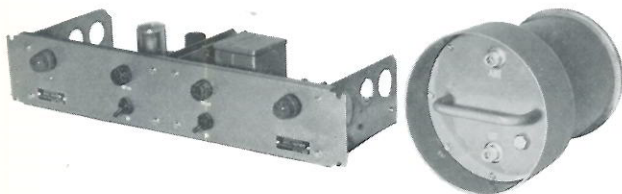
The power amplifier is fully protected by means of two relays, one in the cathode circuit of the VHF-transmitter HTC 1205 and one in the grid circuit of the power amplifier.

Distribution Amplifier HTC 1809 A



This distribution amplifier consists of a power unit, an RF amplifier and a matching network for feeding up to six receivers.

Distribution Unit HTC 1809 B and Aerial Amplifier HTC 1809 C



If the aerial cable is much longer than 50 feet (about 15 m) the aerial amplifier HTC 1809 C and the distribution unit HTC 1809 B may be used with advantage. The aerial amplifier is enclosed in a watertight case and can be mounted in the mast close to the aerial. The supply voltage for the amplifier is fed into the aerial cable through an RF isolating network, making a separate power line unnecessary. Up to six receivers can be connected to the distribution unit.

Test Panel HTC 1808

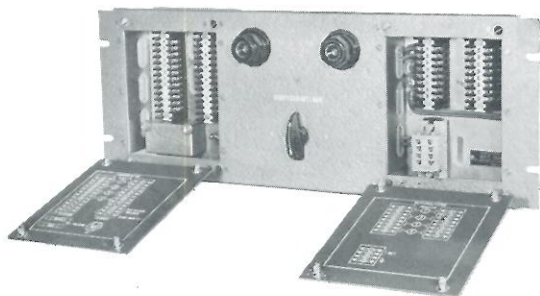


On this panel a microampere meter is fitted, which can be connected by means of the panel selector switch to the test circuits of the various transmitters and receivers.

Thus a quick check of these units is possible.

Terminal blocks are present on this panel for the connexion of the telephone and/or telegraph lines, e.g. for selecting the channels of up to 4 sets.

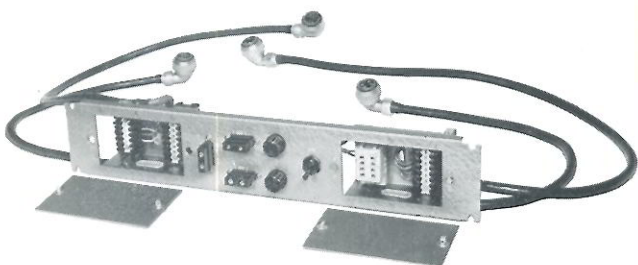
Junction Panel HTC 1807



A main switch on the junction panel enables to break the mains supply to all the connected units. As a rule this panel will be situated in the lower part of the rack or cabinet and the incoming telephone and telegraph lines as well as the mains can therefore be wired up conveniently.

A power supply unit for the channel change-over relays is built-in.

Junction and Test Panel HTC 1810



This simplified panel has been designed in order to place two sets into a 12-unit rack or cabinet.

Two mains switches are mounted on this panel, by which the two sets can be switched on and off separately, whereas a separate microampere meter may be connected to the two test circuits.

The terminal blocks for the connexion of the telephone and telegraph lines and of the mains are easily accessible and have been conveniently arranged.

BASE STATIONS

Technical Data

VHF-Receiver HTC 1105

Frequency Range

156—174 Mc/s. In this frequency range 12 crystal controlled frequencies may be chosen within a band of 7 Mc/.

Sensitivity

With a deviation of 10 kc/s and a modulating frequency of 1000 c/s, the sensitivity is better than 1 microvolt for a (Signal + Noise + Distortion) to (Noise + Distortion) ratio of 12 dB. The audio output is then at least 750 milliwatts into the loudspeaker or at least 1 milliwatt into the 600 ohm line.

Muting

The muting threshold can be adjusted for a signal to noise ratio of between 6 dB and 12 dB.

Selectivity

The selectivity for + or - 35 kc/s, measured at 20 dB noise suppression, is 100 dB.

Image- and Spurious Frequencies

The rejection of image- and spurious frequencies, measured at 20 dB noise suppression, is at least 85 dB.

Frequency Stability

At 20° C the intermediate frequency is adjusted to the centre of the IF pass band by means of a trimmer in the oscillator circuit. With temperature variations from - 10° C to + 45° C and mains voltage variations of + or - 10 percent neither the IF nor the centre of the IF pass band will drift by more than 3 kc/s.

Oscillator Radiation

The receiver oscillator leakage, measured across the aerial connexion terminated with 50 ohms, does not exceed 1 millivolt.

Audio Response

The audio response, measured between 300 and 3000 c/s lies within + 1 and - 3 dB from the ideal response (falling 6 dB per octave; 1000 c/s is 0 dB.)

Audio Output Power

The audio power output with an RF input of 1 millivolt, a modulating frequency of 1000 c/s and a deviation of 10 kc/s, is at least 1.3 watts with a distortion of 10 % on the loudspeaker terminals (10 ohms). On the 600 ohm terminals the power output is more than 1 milliwatt with a distortion of 10 % . The hum and noise level lies then at least 40 dB down.

VHF Transmitter HTC 1205

Frequency Range

156—174 Mc/s. In this frequency range 12 crystal-controlled frequencies may be chosen within a band of 2.5 Mc/s.

Output Power

The RF output power into 50 ohms is 8 watts + or - 1 dB, but may be reduced if desired.

Modulation

Frequency modulation with a maximum deviation of approximately 15 kc/s.

Frequency Stability

The carrier frequency is adjusted to the nominal frequency at 20° C with a trimmer in the oscillator circuit. With mains voltage variations of + or - 10 per cent and temperature variations between - 10° C to + 45° C the carrier frequency will not drift by more than 3 kc/s.

Spurious Radiation

The radiated power of a harmonic frequency lies at least 60 dB below the radiated power of the fundamental frequency. The radiated power of other spurious frequencies lies at least 80 dB below the radiated power of the fundamental frequency.

Audio Response

The audio response measured between 300 c/s and 3000 c/s lies within + 1 and - 3 dB of the ideal response, (rising 6 dB per octave; 1000 c/s is 0 dB). A low-pass filter with a cut-off frequency of 3000 c/s is included.

Distortion and Limiting

With a deviation of 10 kc/s and a modulating frequency of 1000 c/s the distortion is less than 10 per cent. The compressor is then adjusted such that a tenfold increase in audio input (with respect to the input resulting in a deviation of 10 kc/s) results in a maximum deviation of 15 kc/s.

Audio Input Voltage

The audio input voltage across 600 ohms, required to give 10 kc/s deviation is adjustable between 50 and 1500 mV; with the input voltage across 150 ohms this voltage is adjustable between 25 and 750 mV.

Hum and Noise Level

At least 40 dB below modulation with 1000 c/s at a deviation of 10 kc/s.

VHF Power Amplifier HTC 1806

Output Power

The RF output power into 50 ohms is 50 to 70 watts.

Frequency Range

156—174 Mc/s; the channels may be chosen within a band of 1 Mc/s.