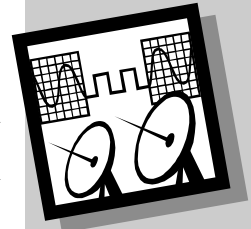
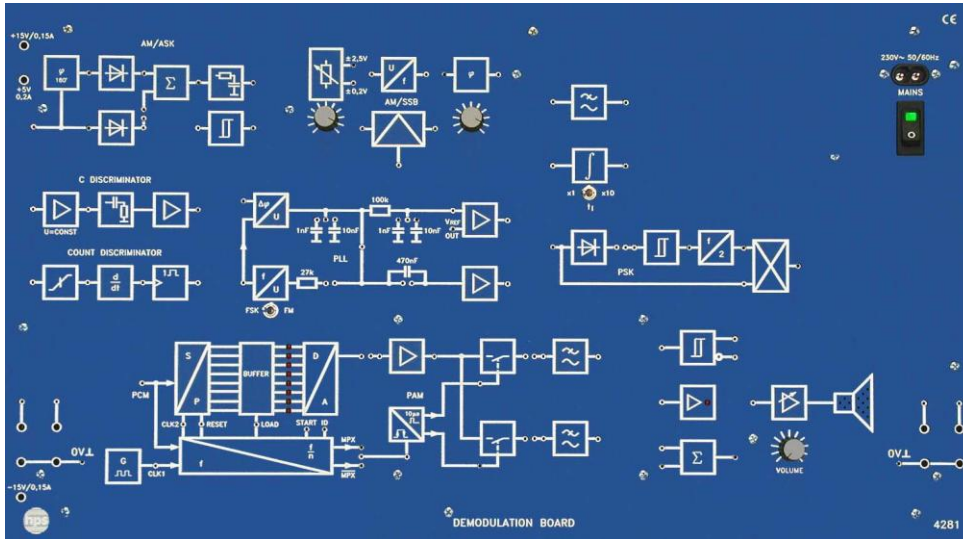


Communications



DEMODULATION BOARD

Type 4281



Front view of the DEMODULATION BOARD

- All the important demodulators on one Board
- For extending the range of experiments in connection with the MODULATION BOARD (Type 4280)
- Reduces experiment setup times to a minimum
- Built-in power supply (short-circuit-proof)
- Additional output jacks for power supply to other units

With the DEMODULATION BOARD, hps offers a training and demonstration system for extending the range of experiments in connection with the MODULATION BOARD (Type 4280).

All output signals of the MODULATION BOARD can be demodulated with the DEMODULATION BOARD.

Its application in the field of communications engineering begins with simple modulation techniques and extends

right up to PAM/PCM technology.

With the DEMODULATION BOARD the following modulation modes can be demodulated:

- **AM / SSB**
Demodulation with envelope demodulator, coherent demodulation
- **FM**
Demodulation with PLL, counting discriminator and C-discriminator

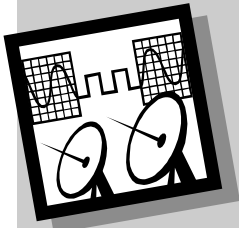
- **PM**
Demodulation with FM demodulators and series-circuited integrator
- **PAM**
Demodulation with dual channel demultiplexer
- **PCM**
PCM demodulator
- **PFM**
Demodulation with low pass
- **DM**
Demodulation with integrator

- **PSK**
Demodulation with reference phase
- **FSK**
Demodulation with PLL loop and Schmitt trigger
- **ASK**
Demodulation with AM demodulators and series-circuited Schmitt trigger

The DEMODULATION BOARD contains a built-in power supply unit for internal power supply and is therefore electrically isolated from the MODULATION BOARD.

+/-15 V and +5 V can be tapped off at 4 mm jacks for supplying power to additionally connectable transmission paths and sources of interference between the modulator and the demodulator.

An audio frequency amplifier with loudspeaker is integrated in the Board for acoustic checking of the demodulated signals.



DEMODULATION BOARD

Type 4281

To conduct the experiments, the DEMODULATION BOARD is placed on a table or suspended in an hps rack for demonstration purposes.

The DEMODULATION BOARD can be converted into a portable training unit by simply screwing it into a Box (Type 4281.20):

All the experiments can be conducted directly in the Box. Dust-free storage and protection against transport damages are further advantages of the Box version.

Mechanical Data

The front panel of the DEMODULATION BOARD is made of 5 mm thick laminate, matt blue in colour with white engraving representing the built-in function groups. The rear of the Board is protected with a grey plastic cover.

Its shape allows the Board to be placed at an ergonomically favourable angle for example on a table.

Subject to technical modifications.

Communications

Accessories Recommended

- Set of Accessories (Type 4280.1), consisting of connecting plugs and leads
- MODULATION BOARD (Type 4280)
- TRANSMITTER BOARD (Type 4282)
- RECEIVER BOARD (Type 4283)
- Experiment manual: „Demodulation Techniques – Demodulators“ (Type V 0131)

Technical Data

Mains connection

- Voltage: 230 V AC / 115 V AC (110 V); 50 VA; 50 Hz ... 60 Hz

DC voltage output (short-circuit-proof)

- ± 15 V / 0.15 A ; +5 V / 0.2 A;
for connecting external devices

AM / ASK

- Half-wave and full-wave rectifiers, switchable, with additional RC wiring.
A low pass can also be used alternatively to the RC wiring.

AM / SSB / PSK

- Coherent demodulation by multiplier
- Generator for carrier generation, adjustable frequency
- Phase shifter, adjustable

FM / PM / FSK

- Counting discriminator
- C-discriminator with constant voltage source

PAM / PCM

- Two channels
- DA converter, 8 bits with LED display
- Buffer memory
- Frame frequency: approx. 16 kHz
- Sampling frequency of the PAM: approx. 8 kHz,
can be replugged to 4 kHz to prove the sampling theorem.
- The control signal for the demultiplexer can be inverted;
this makes it possible to switch over the two channels.

PLL

- For demodulation of the FM and FSK

Integrator

- For phase modulation (PM) and delta modulation (DM)

Schmitt trigger

- For recovery of the digital signals in ASK, FSK and PSK

Low pass filter

- Bandwidth: $f_g = 3.4$ kHz

Adapter field

- Serves for adapting 4 mm to 2 mm connections and for plugging two adapters (BNC socket two 4 mm connectors)

Dimensions and weights

- Board version (Type 4281):
532 x 297 x 90 mm (w x h x d); weight: 3.6 kg
- Box version (Type 4281 and Type 4281.20):
580 x 450 x 155 mm; weight: 6.8 kg