

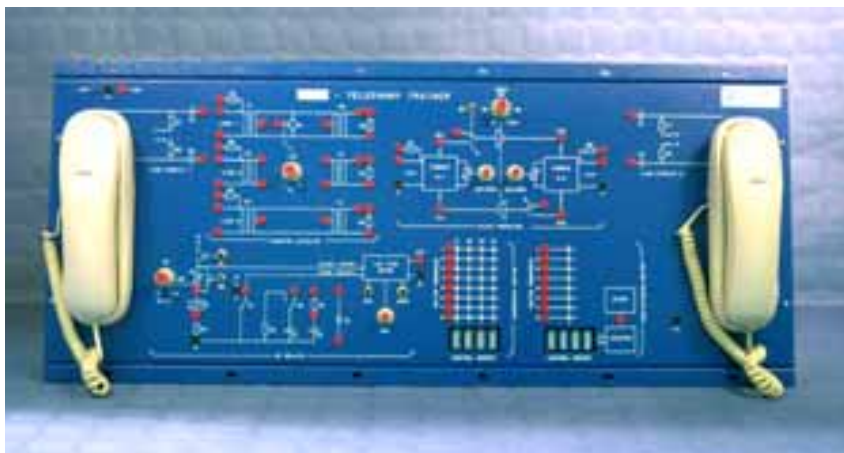
Electron S.R.L.

Design
Production &
Trading of
Educational
Equipment

B46 SERIES – TELEPHONY TRAINING SYSTEM



B4610 – TELEPHONY TRAINER



General:

The B4610 provides a complete view of the fundamentals of telephony, from the characteristics and requirements of the subscriber line, to a presentation of the different switching techniques of phone signals in use.

The trainer is constructed in a sturdy portable case, suitable for desk top and demonstration use. It has a clear synoptic diagram displaying the functional blocks and component identities.

The rugged construction renders this unit particularly ideal for the most demanding of classroom conditions.

Features:

- 2-Telephone handset points
- 3-Simulated telephone line set-ups
- 2-Active hybrid circuits (2-way repeater)
- Area for the study of relay characteristics
- 4x8 Crosspoint switch matrix
- 4x8 Time division switching matrix

The B4610 trainer comes complete with a connection cable kit and extensive instructions manual.

Study topics:

- Telephone lines
- Phantom circuits
- Relays (basic operation)
- Relays with delayed action
- The hybrid circuit
- The 2-way repeater
- The cross-point matrix switch
- Time-division switching techniques: PAM

The B4610 requires a +15, -15V stabilized power supply. The use of the B4192 power supply is recommended.

Optional accessories:

- Dual trace oscilloscope
- Analog multi-meter
- Audio frequency sinewave generator

Ordering code:

B4610

B4620 – TELEPHONE SWITCHING SYSTEM TRAINER



General:

This training system replicates the structure and performance the most up-to-date Automatic Branch Exchanges. The trainer is suitable to teach the structure and organization of modern PBXs as well as to familiarize the student with the service features of such systems. The B4620 can also be used as a general-purpose laboratory unit to experiment with modems, telefax equipment etc..

The rugged construction renders this unit particularly ideal for the most demanding of classroom conditions.

The unit includes 6-internal subscriber terminals, two trunk line interfaces and an operator's position. These are routed by a fully solid-state electronic analog exchange matrix.

The trainer also includes on-board tone and ring generators.

The whole system is controlled by an 8-bit microprocessor.

The trainer is provided with a fault simulating system. The faults are programmed by the instructor by operating a set of 8 microswitches, concealed from the student.

The trainer can be linked to a PC for the purpose of monitoring and studying its operation, as well as to facilitate troubleshooting by the students.

The unit operates from a 110-260V, 50-60Hz AC mains power supply (Please specify voltages while ordering).

The trainer is delivered complete with a connection cables, instruction manual and an accessories kit (6 telephone sets, one PC diskette with system monitoring and diagnostic program).

Ordering code:

B4620

B4622A – TELEPHONE SET TRAINER



General:

The B4622A trainer is a subscriber line telephone set converted into a special training version.

The apparatus makes use of components of the latest design, such as integrated circuit pulse/tone dialer, active hybrid, electronic ringer and dialing keypad. The telephone set can be used as an ordinary phone set when connected to a standard termination of the public telephone network.

The trainer also includes on-board facilities which are not part of a standard telephone but are provided in view of the use of the apparatus as a didactic instrument.

Features:

- Standard subscriber line telephone
- On-board line supply bridge allowing the testing of the instrument locally, eliminating the need of a real a phone line.
- Ring generator - the student performing the experiments can activate the ringer at the touch of a button.
- Artificial line, simulating a line connection of 5km approx.

- Audio amplifier with level control and loudspeaker to demonstrate the transmission characteristics of the set.
- Set of components (resistors and capacitors) to perform the experiments.

The auxiliary facilities require a +15/-15V stabilized DC power supply. Use of the B4192 power supply is recommended.

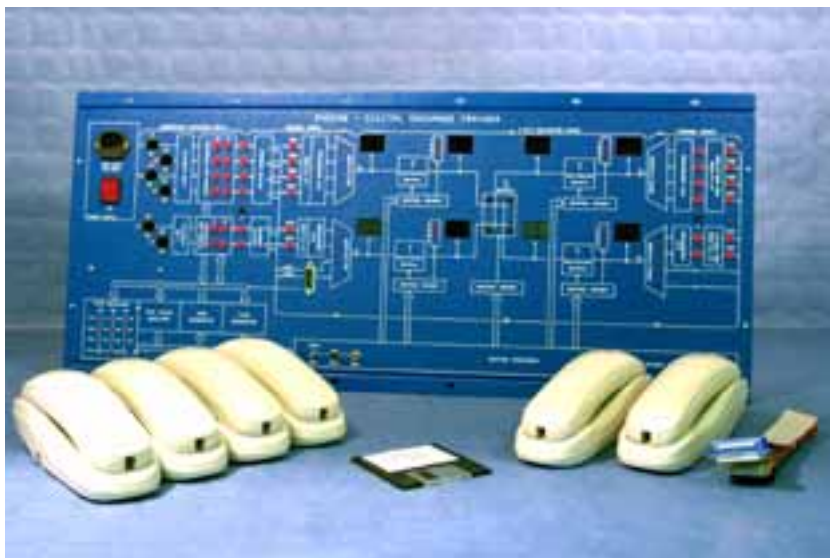
Note: No connection to a power supply is required when the auxiliary facilities are not in use, i.e. when using the apparatus as a standard phone set, for instance connected to a termination of the public telephone network or to a port of our B4620 Telephone Exchange or B4622B Digital Exchange Trainer.

The trainer is delivered complete with an accessories kit and an extensive instructions manual.

Ordering code:

B4622A

B4622B – DIGITAL EXCHANGE TRAINER



General:

This trainer is a scaled model of a Digital Telephone Exchange, having the capacity of 6 extension lines (phone lines) and provides with facilities that allow deep investigation of the Digital Switching techniques.

Features:

- Digital, time-division switching network of the TIME-SPACE-TIME (TST) configuration. Each switching matrix (stage) is provided with Control Memories whose contents can be displayed by on-board indicators and monitored by a PC with the appropriate software (included)
- Two Multiplexer/Demultiplexer stages, each one to process the signals of the 4 digital sources/destinations
- Channel Banks, that provide the A/D conversion of the phone line signals entering the exchange and the D/A conversion in the opposite direction
- Line Signaling Interface, to process the signals to/from the phone lines according to the standards in use (Ring, Seizure, pulse and tone dialing, etc.)
- Dual-Tone, MULTI-FREQUENCY receiver (DTMF), to process the dialing information.
- Pulse-dialing mode can be used in alternative to DTMF
- On-board CENTRAL PROCESSOR UNIT (CPU). The exchange operates at standard rate (8k samples/sec) or in STEP mode, under the student control, to study the signal processing within the exchange in a quasi-static manner. When in run mode, the exchange allows standard-quality telephone conversations.
- Serial interface (RS232C) for use with an IBM compatible PC. This allows off-line monitoring of the exchange operation.

The trainer comes complete with 6 phone sets with both pulse and tone dialing capability, cables accessories kit, software monitor program and an extensive instructions manual.

The B4622B is powered from an AC mains supply of 110 to 250V, 50 or 60Hz (Please specify when ordering).

Ordering code:

B4622B

B4625 - CELLULAR MOBILE TELEPHONE TRAINER



The trainer is aimed to familiarize the students with the structure, system organization and physical implementation aspects of Land Mobile Cellular phones.

The trainer consists of a commercial apparatus of GSM standard, transformed for the requirements of training. The internal structure is made observable and some sections of the electronics are removed from the original position and displayed on a synoptic board. This last also shows a clear system block diagram, with test access points.

The system is provided with a microswitch-actuated fault simulator. Several different fault situations are provided, covering all the major system sections. The microswitches are concealed to the students and accessible to the instructor.

The trainer is complete with accessories (battery charger and cables) and instruction manual. An additional phone can be supplied as an option.

Study topics:

- Structure and characteristics of a cellular telephone system
- International standards
- Network control; use of radio channels for the conversation and for the control signals

- Types of modulation used
- Functional characteristics of cellular telephone set
- Portable and vehicular equipment
- Measurements on various cellular telephone sets:
 - Keyboard and display
 - Control microprocessor
 - Audio processing circuits
 - Data processing circuits
 - Modulator and transmission circuits
 - Reception circuits and demodulator
 - Power supply circuits
- Troubleshooting

Technical specifications:

- Capability to operate in the standard GSM 900 and GSM 1800 bands (P-GSM, E-GSM, DCS 1800 MHz).
- Number of channels: 1320 for the GSM 900 band and 885 in the GSM 1800 band
- Power supply from on-board batteries with battery charger at 220 – 240 V (other voltages on request)
- Hand-free device, cables and instruction manual included

Ordering code:

B4625

B4630 – MODEM TRAINER

General:

This trainer consists in a top-quality industrial apparatus, transformed for use in a training aid.

The modem can communicate over public switched lines with any other modem conforming ITU-T (formerly CCITT) recommendations. In addition to that a pair of B4630 modem trainers can be made to communicate locally, without the engagement of public lines, using the B4620 – TELEPHONE SWITCHING SYSTEM TRAINER or the B4680 – TELEPHONE LINE SIMULATOR.

The trainer has a clear synoptic with the system block diagram. The front panel includes controls/indicators/test access points to perform the experiments.

The B4630 modem conforms to the most updated communication standards.

In summary they provide DATA/FAX/VOICE communications as follows:

Data:

- ITU-T V.92
- ITU-T V.90 56k bps down stream only
- ITU-T V.34
- ITU-T V.32
- ITU-T V.22
- V.42 Error correction
- MNP2-4 Error correction
- ITU-T V.32bis
- ITU-T V.22bis



- V.42bis Data compression
- MNP5 Data compression

Fax:

- V.17 (14400 bps FAX)
- V.27ter (4800 bps FAX)
- V.29 (9600 bps FAX)

Voice:

- Voice/Audio mode
- Full-Duplex speakerphone

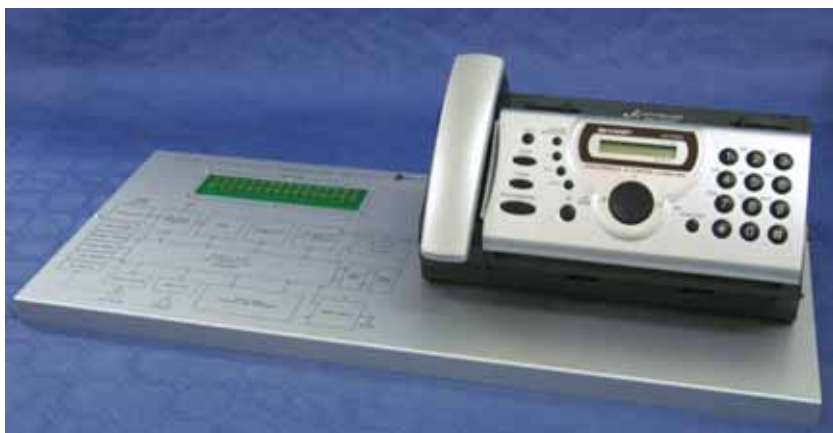
The trainer is supplied with a connection cable kit, instructions manual and a CD with the support software.

In order to study this apparatus fully, the purchase of this trainer in pairs is recommended.

Ordering code:

B4630

B4640 – TELEFAX TRAINER



General:

The unit consists of a commercial apparatus of a renowned make, modified for didactic use.

The telefax trainer conforms in features and performance the latest design equipment in commercial use. It is constructed in such a way that the operation of the system can be analyzed and studied through the test points provided on a synoptic board, which fully displays the functional block diagram of the unit.

Guided experiments are described on each section of equipment.

Features:

ITU-T (CCITT) G3 mode compatibility
Half-duplex transceiver
Modified Huffman compression scheme
Manual/Automatic operation
8-tone gray-scale
facilities in line with the industry-standard machines of latest design.

Study topics:

- Front panel block
- Central control unit
- Operator interface

- Fax processing unit
- Thermal printer
- Optical scanner block
- Image scanner block
- Modem block
- Speech and ringer circuits
- Telephone line interface

A second standard fax machine is to be provided in the fax trainer, allowing complete study of the reception and transmission principles.

The B4640 trainer can be used with the B4680 Telephone Line Simulator or the B4620 Telephone Switching System, to implement a complete communications set-up without the need for expensive trunk telephone lines.

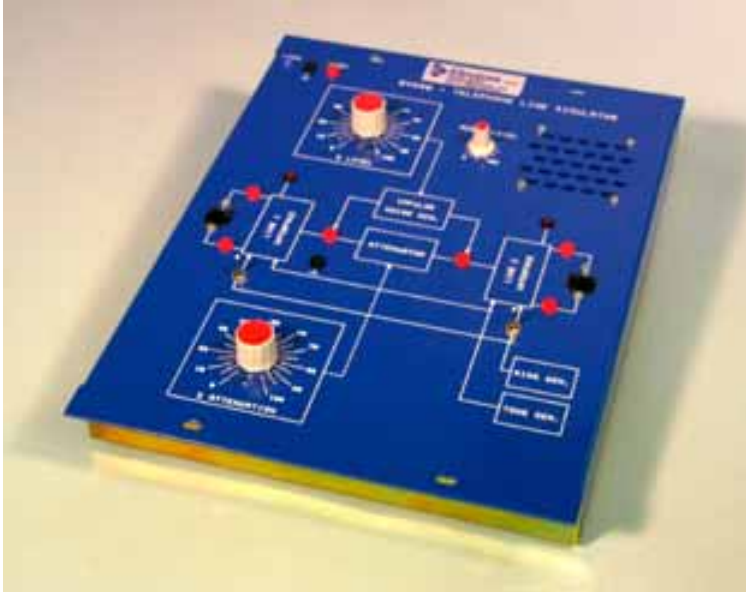
The trainer comes complete with a cable accessories kit and an extensive instructions manual.

The unit has a built-in power supply, operating from mains 110-240V, 50/60Hz (Please specify when ordering).

Ordering code:

B4640

B4680 – TELEPHONE LINE SIMULATOR



General:

This instrument can be regarded as a general purpose testing apparatus for telephone equipment. It makes available two interconnected telephone line sockets which have all the electric and functional characteristics of standard telephone public lines. This allows testing of equipment such as telephone sets, modems, PABXs, automatic answering machines, etc. without actually engaging the costly public lines. Another advantage is that the line parameters (attenuation, noise) can be pre-set by the operator.

The B4680 includes an on-board dialing tone generator as well as a ring signal generator.

The apparatus is delivered with a cable accessories kit and instructions manual.

The unit requires +15/-15V DC stabilized power supply. The use of the B4192 is recommended.

Ordering code:

B4680