BUYING A LANGUAGE LAB-- WHY AND HOW YOU SHOULD

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The purchase of a language lab is a significant step for any language department. Labs are expensive, they occupy space that is always at a premium in any school system, and they have had very bad press in recent years. How do you convince your administration to buy a lab? What are the necessary steps you should take before buying a lab? What type of lab should you buy? What are some of techniques that can be used in the lab? These are some of the questions that this article will atempt to answer.

Why Buy a Language Lab?

1. Good Acoustics

The lab provides all students---no matter where they are seated in the room with equal opportunity to hear the teacher/source clearly and to have their responses heard by the teacher.

2. Privacy

The headset/microphone provides students with psychological privacy that promotes their speaking skills by lessening their inhibitions.

3. Self-Pacing

Students may work through lesson material at a pace suited to their ability. The lab is like a personal tutor who never gets tired.

4. Individualization

In many labs it is possible to assign different programs to different groups of students according to their interests and needs.

5. Efficiency

The teacher can monitor individual students, offering criticism and praise, more efficiently from the console than in a regular classroom. The work of other students is not interrupted as a teacher monitors an individual from the console.

6. Variety

The equipment and software allow students to have access to an abundance of role models, native speakers using different accents and dialects, and to situations that reinforce cultural roles.

7. Record/Compare

Students are able to record their voices, and with careful preparation by the teacher, learn to listen to their own responses and, hopefully, correct them. This is an acquired skill for most language learners; it does not come easily nor without teacher help.

8. Testing
The lab provides the perfect environment for testing of listening comprehension and oral proficiency skills.
9. Library Study
For those schools capable of providing open lab hours, students have the opportunity to spend extra time practicing listening and speaking skills.
10. Teacher Monitoring
Since the teacher is not concentrating on producing the next question or drill, there is more time to evaluate student work.

Steps to Take Before Buying a Lab

The purchase of a language lab is an expensive and complicated proposition and it is important that those who have this responsibility proceed carefully. The first step that should be taken is to have a meeting of the language faculty and establish how they plan to use the lab. If, for example, the lab is only to be used only for library study then there is perhaps no need to purchase a console, but the cassette decks should be capable of all the functions deemed important by the faculty.

The second step that should be taken is to contact various vendors and visit language labs that they have installed. It is important that you go to these visits well prepared. You should have a list of questions to ask of the lab director, the faculty and the students. Some questions you might ask are: 1) How often do malfunctions in the equipment occur? 2) Does the vendor accomplish repairs quickly (i.e. within 24 hrs)? 3) Does the equipment perform as described? 4) Would you buy the same equipment again? 5) Was the installation performed satisfactory? 6) Do the faculty use the lab for class instruction? (if not, is it because the console is difficult to operate) 7) How do students like the student recorders? Are they easy to operate and is the sound quality good? These are just samples of the types of questions that are important to the prospective purchaser.

The third step is that a consultant should be hired. Most consultants charge between $200 and $300 a day (plus expenses). You may easily save that much money through avoiding mistakes in your purchase. If you are unable to hire a consultant, you should contact the International Association for Language Labs and ask any questions you might have (a lab planning kit is available to IALL members for $5.00).

The fourth step is the writing of specifications. This can be done by a consultant or you may use the examples that are given in this issue and write your own.

Use this list to start discussions; consider which items or functions are seldom needed or are optional. Some items might best be acquired separately and connected to the console as needed (e.g. reel-to-reel recorder, short wave, record player). Of prime importance is the simplicity of operation of the equipment for the teacher and for the students, the ability for individualized and group instruction, and, finally, the convenience for maintenance and repair.

1. teacher's console
-----number of program sources available
-----student positions and group remote control
-----fast duplication
-----testing control
-----automatic pairing
-----conferencing

a. master cassette recorder(s)
b. master reel recorder
c. record player
d. short-wave radio
e. remote control for video playback
f. speakers and amplifiers for room p.a. system
g. rear-screen projection for slides, films, overhead projectors, and video projectors.
h. cassette storage cabinets
i. cassette duplication
j. headsets for teacher with long cords
k. elevated platform for console
l. cassette tape eraser
m. cassette rewinder
n. location/height of program sources; drawers/shelves/built-ins
o. additional audio/mic or video input jacks for the console
p. clearly marked features on the console, tape counters on the recorders or elapsed time measurement, lighted dials

2. student positions
-----quality of sound reproduction
-----automatic sentence repeat

a. desk/booths in acceptable color (avoid colors that invite graphiti), angle-braced if necessary, at least one position should be wide enough for a wheel chair.
b. student controls, ease-of-use; wires concealed
c. storage for headsets
d. dust cover on cassette well

e. writing surfaces for both right and left handed users
f. cleanable surfaces, slanted desktops
g. locking cassette lids controlled from console
h. library operation or group operation
i. cassette deck located for ease of operation

3. room needs
a. porcelain boards clearly visible to the students
b. sound proofing on walls, carpet on floors
c. posters/frames for changeable art displays
d. bulletin boards
e. window coverings
f. security measures for windows and doors
g. adjacent to repair center or telephone access to the repair center
h. adjacent room for observation for master/student teaching
i. handicap access to student booths, to console
j. air conditioning for room with local control of temperature
k. mounting hardware for video/projection system
l. blank cassettes
m. grounded power outlets
n. coat hooks or racks for students

4. contract wordings; an overview with the number and type of pieces of equipment as well as spare items (headsets, cables, boards, etc.) and any specialized tools and testing kits required for maintenance.
a. specify who does the installation (the manufacturer, a company, local dealer, or authorized representative)
b. state institutional terms of payment and the need for a performance bond
c. list company requirements if the installation fails to meet expectations of if design flaws appear during the warranty period
d. state clearly the completion date and penalties for meeting that date
e. include seller agreements for emergency service, replacement parts, and labor during the warranty period, but also list obvious exceptions
f. include as a prerequisite for bidding, the submission of all operating and repair manuals and other pertinent publications for the equipment

5. Layout considerations for furniture and floor plans
    a. U-shaped in rows or rounds
    b. staggered placement for visibility
    c. elevated rows with lower set console (theater setting)
    d. booths along the perimeter of the room with the center area open for other activities, the console elevated on one side
    e. cirular lab with console in the center of the circle, free/library mode at the teacher's back
    f. clusters with or without an elevated console
    g. half circles for fifteen or twenty booths around a console, free/libarry mode positons along a wall
    h. contrasting rows
    i. single positions and multi-person booths
    j. small viewing rooms for class discussions
    k. satellite reception areas for groups or individuals
    l. workspace: cassette storage, library for originals, duplication area (angled shelving to hold cassettes; sized shelving for reels, films, videos)
    m. traffic patterns, bad weather guards, handicap passage
    n. security measures
    o. slots in the door or wall for after-hour drop-offs
    p. bookshelves for student materials

SPECIFICATIONS

The writing of specifications for a language learning lab is a very exacting process. The detail provided in the specifications must describe the equipment functions which are desired so that the manufacturer/dealer may provide a correct bid for the installation. Manufacturers have stated that schools can make unrealistic technical demands when operational demands are not understood and when teachers have not spent appropriate time learning how the equipment operates. Teachers have been disappointed to find that the equipment purchased does not fulfill their needs.

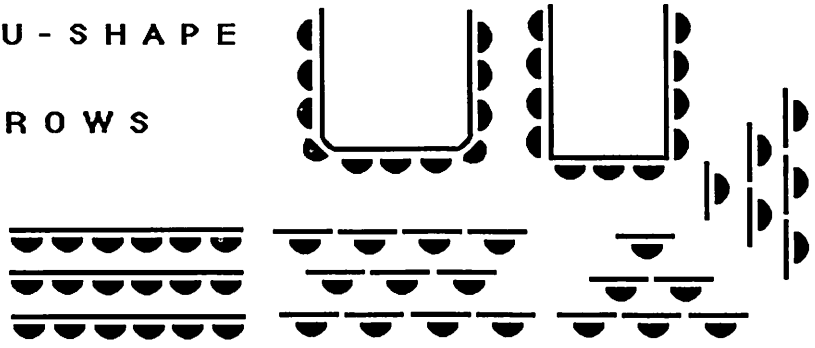
Language Lab Specification Sheet
Prepared by C.P. Richardson

Introduction

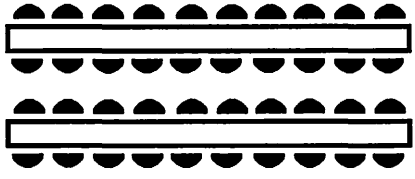
The following is a sample specification sheet. The information in it is intended as a guide for developing your own specifications. Since laws vary from state to state we cannot assume legal responsibility for the document. Your purchasing agent and your institution's lawyers should examine any specifications you develop to determine their appropriateness for your situation.

U - S H A P E

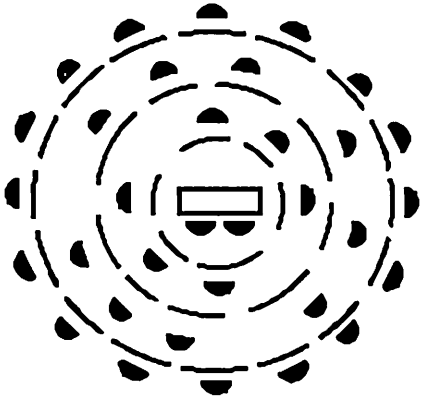
R O W S



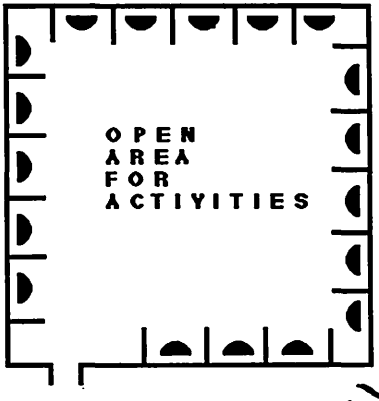
M O R E R O W S



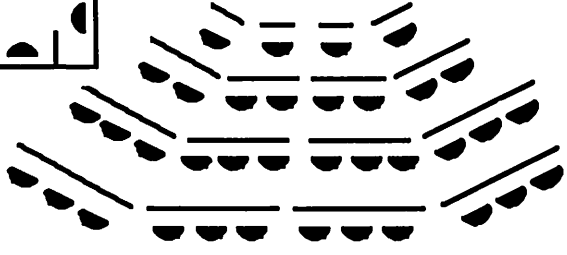
OPEN CIRCLE



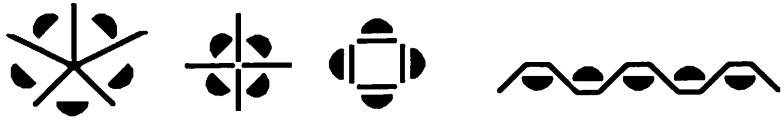
PERIMETER OF ROOM



ELEVATED ROWS WITH
LOWER SET CONSOLE
(THEATER SETTING)



CLUSTERS



In several instances you will note that options are given. This is indicated by an "or" between two sections. Both statements are possibilities and you should choose the one that is most appropriate.

Language Laboratory Specifications
(It is helpful to the dealer if the first page contains a general summary of the equipment needed for your lab.)

Summary
1 Teacher's console and associated equipment.
or
1 Teacher's console and associated equipment to provide remote control of student decks.
2 Cassette master recorders for console
1 Headset/microphone for console
2 Hi-fi speakers and amplifier
30 Student cassette recorders
35 Student headset/microphones
Installation, necessary cabling, and hardward for the lab.
Furniture
30 Student carrels
1 Console furniture
Accessories
(Various accessories can be bid as part of the lab. Here are some examples:
Videocassette Recorder
Movie Projector
Slide Projector
Tape Duplicator
Tape Eraser
Cassette Storage Cabinets

(Name of Institution)

I. GENERAL CONDITIONS
1.1 This specification describes a selection of interconnected items of electronic equipment to be installed at_____, hereinafter termed the institution.

1.2 The equipment herein described and specified is to be installed in (Name or number of room and building and institution), and the area so designated, together with the equipment to be installed therein, shall hereinafter be termed the electronic classroom.

1.3 The institution will eventually negotiate only with a single selling agency, to whom funds will be paid, and who will be responsible for the successful completion of the electronic classroom installation. This selling agency, whether the manufacturer, his representative, agent, or duly approved firm of installers, shall hereinafter be termed the seller.

1.4 Actual installation shall be made by authorized agent of the manufacturer, who is thoroughly familiar with the equipment, and who shall have available to him, whenever required, the services of a factory engineer.

1.5 The seller shall supply and install all equipment, wire, and incidental hardware necessary for the successful completion of the installation, except for electrical power service and outlets as shown on the electrical diagram.

1.6 The seller shall agree to install all equipment in a professional and workmanlike manner, in accordance with good construction and engineering practices.

OR

1.6 The institution shall install all equipment. The seller agrees to provide full warranty if this installation meets all accepted standards of workmanship and engineering practices.

1.7 The institution so reserves the right to withhold final payment for equipment furnished and services rendered by the seller until thirty (30) calendar days shall have elapsed, during which--------operation shall have included full and satisfactory implementation of all specified functions of all equipment, and performance at least according to the minimum standards set forth in these specifications as certified by the institution's designated technician or consultant. The last day of this 30-day period shall be considered the official completion date.

1.9 The completion date for the installation of the equipment shall be no later than 45 days after the purchase order has been issued.

1.10 If award includes installation, failure to meet the completion date shall result in liquidated damages of $100.00 per day for each day past the date given above in 1.9. Completion date means that all equipment is installed and that all components of the lab are operating as required in these specifications.

1.11 The seller shall agree to furnish all emergency service, including parts replacement and installation labor, both until the official completion date as determined in 1.7 above, and for a period of one calendar year thereafter. Such service shall be furnished within 24 hours after an authorized service request. Before the official completion date, such service, parts replacement and installation labor shall be furnished without cost to the institution, except in cases of obvious vandalism. For one calendar year thereafter, such service shall continue to be furnished without cost to the institution except: (1) in cases of obvious vandalism, and (2) in cases of trivial service request due to failure of teaching personnel to understand the operation of the equipment.

1.12 The seller shall agree to furnish all schematics, parts lists, wiring diagrams and service manuals pertinent to the equipment in the electronic classroom.

1.13 No bids for equipment for this lab will be accepted if there is no demonstrable proof that the same type of equipment has been installed and successfully used for at least six months prior to this time.

1.14 The seller shall ascribe to the fact that there exists no documented proof of design faults in the equipment and if this proof does exist must demonstrate that steps have been taken to correct the fault.

1.15 No bid will be accepted unless the institution has had the opportunity to test a student recorder and headset for at least fifteen days and these dates must be before the bid opening.

1.16 All operating manuals, repair manuals, schematics (with any modifications indicated), and other pertinent publications must accompany the bid material or it will not be accepted and will be considered a NO BID.

2. GENERAL DESCRIPTION

2.1 The electronic classroom shall contain a teacher's console with ____ cassette tape program sources and switching facilities for the control, switching, and distribution of audio learning materials.

2.2 The console will have facilities for monitoring and teacher-student intercommunication.

2.3 There shall be_____student positions in the classroom of which all shall be equipped with microphone-headsets and dual-channel, four track cassette tape recorders (the other options here would be half-track cassette

tape recorders) for audio-active listening and comparing or, all should be equipped with headset/microphones and the necessary amplifiers for audio/active listening and speaking.

2.4 The term "audio-active-compare" shall be defined to mean that the student having his own recording facility shall be able to listen to any designated program source, and, while responding, hear his own voice amplified through his own headset-microphone system, and, when desired, make a recording of his own voice on his own tape recorder for comparison with the master track.

OR
2.4 The term "Audio-Active shall be defined to mean that the student can listen to any designated program source, and, while responding, hear his own voice amplified through his own headset/microphone system.

2.5 The term "dual-channel tape recorder" shall be defined to mean a cassette tape recorder which provides separate program and student tracks using a four-track two-channel configuration (or a half-track two-channel configuration). The master track shall be recorded on tracks one and four (or tracks one and two if half-track) and the student track on tracks two and three (or three and four if half track) depending on the direction in which the tape is running (The latter statement would be deleted for half-track recorders since they can only play the tape in one direction).

3. GENERAL SYSTEM SPECIFICATIONS
3.1 Conservation Operation: No transistor, condenser, or resistor anywhere in the system shall be operated in excess of the maximum ratings specified by the original parts manufacturer for the class operation involved.

3.2 Extraneous noise: Extraneous noise, including hum, crosstalk, AC hash, frying noises, feedback under normal operating conditions, microphonics, and switching transients, shall be inaudible at normal listening levels.

3.3 Heavy-duty equipment: Cassette tape recorders: The seller shall subscribe in writing to the following statement: the basic mechanical design of the cassette tape recorder units used is not that of units originally designed for home service. All components have been chosen and built to withstand the rigors of institutional use.

3.4 The headbands and cords and plugs furnished with the headset-microphones shall likewise have been designed to withstand the rigors of institutional use. The seller shall furnish, if required, written evidence that these items have a good service record. If the items proposed are a new development, the seller may also be required to furnish a description of the testing procedures used by the manufacturer to establish their durability.

3.5 Control knobs: Control knobs on volume controls and switches shall be secured with allen-head screws. Round-shaft controls shall be unacceptable.

3.6 Volume controls: Preference shall be given to volume controls which incorporated special features designed to increase ruggedness and reliability: Conventional types shall, however, be considered acceptable.

3.7 Tape breakage: It shall be impossible to cause breakage or spillage of the cassette tape through normal operation of the recorder.

3.8 Balanced levels: The system shall be so designed that, at a satisfactory volume in any mode of operation (record, playback, listen, intercom, monitor) switching to another mode will not cause disturbing changes in volume.

3.9 Constant output with varying load: The system output circuitry shall be such that the output level does not vary more than 3db from no load to full load.

3.10 Impedance matching: Impedance and compatibility considerations shall be observed in accordance with the basic design of the complete system and in accordance with approved engineering practices.

3.11 Provision for expansion: Initial wiring shall provide sufficient cable for all present and future distribution needs.

3.12 Easy accessibility: All individual components shall be readily accessible for service.

3.13 Component parts lists and schematics: To assure ready access to necessary replacement parts and essential service data, the seller shall supply with the bid: (a) a parts list for each component sub-assembly, which distinguishes between standard parts--those readily available from electronics parts dealers--and parts of proprietary design, available only from the manufacturer; (b) an accurate schematic diagram of each component sub-

assembly to facilitate diagnosis of circuit and component malfunction, component replacement, and circuit and mechanical adjustment; (c) a service manual for each component sub-assembly.

3.14 System wiring diagrams: The seller shall supply with his proposal a wiring diagram of a typical installation, to suggest proper installation techniques, and to indicate the method and materials for interconnection of the various major units. Upon completion of the installation a detailed wiring diagram of the final installation shall be supplied, to indicate wire location, the location of junctions, connections made at junctions, the type of connectors, wire coding, and any other data considered essential for efficient service.

4. THE TEACHER'S CONSOLE

4.1 The learning laboratory console equipment will be installed in furniture supplied by the seller (or installed in the existing console furniture with any modifications needed to be made by the seller) There shall be sufficient space on the console to provide the instructor with a place to write and the housing for the tape program sources shall be such that it is readily accessible for operation by the instructor. Cassette sources shall not be housed in drawers or mounted below the level of the console operating controls unless said design is approved by the institution.

4.2 With the exception of specialized accessories, the learning laboratory console will be entirely self-contained with all necessary amplifiers, power supplies, switching circuitry,m etc., being housed within the console.

4.3 The console will be designed to serve at least _____ students.

4.4 The console shall be designed to distribute _____ program sources. A single program source may be distributed at random to any student, to all students, to a single group of students, or to more than one group of students. (This might read that a single program source may be distributed to all students, to a single group of students or to more than one group of students.)

4.5 (The following is not available on all consoles. Consideration must be given to the importance of this function) Digital illumination of the selection program shall appear on the console panel so that the teacher can determine which program the student is hearing. Indication of student operation of the recorder should appear on this panel.

4.6 Equipment and accessories. The console shall be furnished with the following equipment installed:

4.6.1 ____ cassette master playback unit(s).

4.6.2____ reel-to-reel recorder. (This would only be required if you have the necessity of using reel-to-reel tapes from your library)

4.6.3 One headset/microphone

4.6.4 Two high fidelity speakers to be mounted on the wall in the front of the room. An amplifier for proper amplification of the console speakers will be supplied by the seller.

4.6.5 The seller shall provide an audio input jack for one of the program lines of the console. This jack shall be connected with an isolation transformer or other device that prevents damage to the console when connected to tv monitors, record players, or other external audio devices. This jack shall be readily accessible to anyone connecting such devices for distribution of the audio to student positions.

4.7 Console functions. The following functions shall be able to be performed at the console:

4.7.1 A minimum of_____ (the "normal" amount is four) different programs can be distributed at one time. Any prigram can be distributed at random to any student.

4.7.2 The teacher's live voice can be a program source and can be recorded on the master track at the student's position when desired.

4.7.3 Any student position in the lab may be connected to any other student position in the lab so that a conference conversation may be held either with or without the teacher. (This function is not available on all equipment and should not be included unless desired)

4.7.4 It will be possible for any or all students in the lab to work in a LIBRARY mode. While in LIBRARY mode it shall be possible for students to eject their cassettes without the necessity of someone being present at the console.

4.7.5 All student recorders will be capable of being remote controlled by the teacher. The teacher can control all students' recorders, the student recorders to which any program is being sent, and those are in the LIBRARY mode at any one time. (This section will vary depending on the remote

control functions desired. Some equipment does not permit the remote control of anything other than rows or groups of students. Some equipment does not permit remote control of the student recorders.)

4.7.6 The teacher can communicate with any student at any time. The teacher will be able either to listen in without the microphone being active or to talk and listen to individual students.

4.7.7 Any program which can be in the teacher's headset will also be able to be switched to the external speaker system.

4.7.8 The signal levels of the programs which are being distributed to the students will be automatically adjusted. (This may be a desirable function. You may wish to state that the signal levels will be determined by adjusting the volume controls at the program source according to signal representation on a VU meter or similar indicator.

4.7.9 The power on/off switch for the console will be operated by a removable key. Three colies of this key will be supplied by the seller.

OR

4.7.10 A control at the console will make it possible for the teacher to lock the lids of the student recorders so that the cassettes cannot be removed except when the proper switch at the console is activated. During library operation, however, it shall be possible for students to remove cassettes from their machines without the need for someone to be present at the console. (This function is not available on all equipment and may not be desirable if you are not concerned with students stealing tapes during group study)

4.7.11 All switching operations for program distribution, intercom, monotor, all-call, etc. shall be solid state switching. (or electomechanical switching utilizing gold-plated contacts on switches)

4.7.12 It will be possible for the teacher to monitor any of the programs being distributed to students.

4.7.13 All switches, keys, level controls and other controls will be clearly marked as to their function in durable lettering.

4.7.14 The console will have a three wire power cord and will be adequately fused.

4.8 ELECTRICAL/ELECTRONIC SPECIFICATIONS FOR THE CONSOLE

4.8.1 The frequency response will be no less than 100 to 10,000 Hz +/- 3 dB.

4.8.2 The signal to noise ratio will be 45 dB or better.

4.8.3 Crosstalk will be less than 50 dB

4.8.4 Power requirements 120 vAC

4.8.5 Distortion factor less than 1%

4.8.6 Inputs

a. Headset/microphone

Four program inputs (This will be determined by your needs. The number of inputs available on consoles varies so be very sure you have sufficient inputs to meet your demands) one of which shall be so connected that it is possible to plug in an external program source by means of a jack mounted on the console furniture or mounted on the console in such a way that it is readily accessible. This program source will normally by connected to an audio line which can be connected to a movie projector in the back of the lab. (This permits broadcast of the movie soundtracks to all seats in the labs) The movie projector line will be disconnected when an external source, such as a tv monitor, is plugged into this jack. The line shall contain an isolation transformer to protect the console circuitry.

4.8.7 Outputs

a. Headset/microphone

b. Program-wired to amplifier and external speakers.

4.9 CONSOLE CASSETTE RECORDER

4.9.1 The console master recorders will make use of a standard Philips cassette and will be a quarter track, two channel recorder.

OR

4.9.1 The console master recorder will make use of a standard Philip cassette and will be a half-track, two channel recorder.

4.9.2 The recorder will be specifically designed for educational use. Units designed for home use will not be acceptable.

4.9.3 The recorder shall have as a minimum; the following controls:
a. Power On/Off with indicator. (Some recorders will not have this function and will be activated when the console is turned on.
b. Playback volume control capable of adjusting volume level of the student and master tracks separately so that either track may be turned all the way down.

OR
b. Playback will be automatically adjusted for correct recording levels at the student booth.
c. Repeat button which will automatically rewind the tape to the beginning of a sentence, phrase, or word, wherein the tape will play again. (This function may not be available on all models of lab equipment).
d. Standard cassette controls: Rewind, Stop, Play, Fast forward.
e. Cassette eject button
f. Tape counter

4.9.5 The recorder shall automatically shut off and release the pinch roller when it reaches the end of the tape.

4.9.6 A headset/microphone jack shall be provided.

4.9.7 A service and maintenance manual shall be provided which shall include the following as minimum requirements:
a. Performance specifications, alignment and adjustment procedures, complete schematics with corrections made for any modifications made on the installed machine.
b. PC Board layout, both sides if applicable, and component identification.
c. Complete parts lists and part numbers.
d. Exploded assembly views showing all components and parts numbers.

4.9.8 Specifications for console cassette recorder
a. Frequency response 50-10,000 Hz +/- 3dB
b. Signal-to-noise ratio 42 dB
c. Wow and flutter 0.15 wrms
d. Track system 4-track, 2-channel.
OR
d. Track system half-track, 2-channel.
e. Inputs 1 microphone input and 2 line inputs
Outputs 1 headset output and 2 line outputs
f. Motors-There should be three motors. One should drive the capstan; one should drive the supply reel; one should drive the take-up reel of the cassette recorder.

4.9.9 The seller shall provide all necessary connections, hardware and other materials necessary to mount the cassette recorders either in the console furniture or in an adjoining pedastel.

4.10 CONSOLE HEADSET/MICROPHONE

4.10.1 One headset/microphone shall be provided for the teacher's console. The headset/microphone will have the correct impedance matching and power requirements to function with the console.

4.10.2 Specifications for the console headset/microphone
Earphone elements
frequency response 30-10,000 Hz +/- 3 dB
sensitivity -90 dB
dynamic type

Microphone element
frequency response 30-10,000 Hz +/- 3dB
sensitivity -90dB
dynamic noise cancelling type
the microphone should be shut off when rotated to the extreme upward position

5. THE STUDENT POSITION

5.1 The student cassette recorder. There shall be_____ student cassette recorders provided. (One spare unit) The student recorders shall be specifically designed for educational use. _____of these recorders shall be installed in existing furniture.

5.1.1 The recorders shall be two-channel recorders permitting simultaneous recording on the master track and the student track. The recorder shall use the 1/4 track system permitting the use of both sides of the cassette. Master recording shall take place on tracks one and four and student recordings shall take place on tracks two and three depending on the direction of recording.

OR
5.1.1 The recorders shall be two-channel recorders permitting simultaneous recording on the master track and the student track. The recorder shall be of the half-track variety with master recording taking place on one track and student recording taking place on the other.

5.1.2 It shall be possible to listen to a pre-recorded master track while recording on the student track.

5.1.3 It shall be possible to listen to both the master and student track simultaneously.

5.1.4 It shall be possible to monitor the student recorder from the console without the student being aware that he is being monitored.

5.1.5 It shall be possible for the teacher to talk to the student without being recorded on the master track.

5.1.6 During intercom the master program shall be muted, but shall continue to be recorded.

5.1.7 The recorder shall have as a minimum the following controls:
a. Power on/off (This is optional)
b. Volume control for adjusting balance between program and student channels. (This is optional).
c. Call button permits student to call instructor. (This is optional)
d. Three digit counter with reset
OR
d. Four digit counter with reset.
e. Standard cassette controls-play, rewind, fast forward, and stop
f. Repeat, when button is pushed during playback or drill mode, tape which has just been played automatically rewinds to the start of a sentence and playback is repeated. (This function is not available on all models of equipment).
g. Student drill button; this button permits student's practice to be recorded.
h. Cassette eject button. This button will remain operative whenever the student position is in the library mode.
i. Cassette compartment lid. May be locked by teacher by remote control. (Optional)

5.1.8 The recorder shall include all-mode shutoff turning the unit off and releasing the pinch roller regardless of the mode of operation.

5.1.9 The student recorder shall be completely remote controllable from the console requiring no prior manual settings or operation on the part of the student. When being controlled from the console, control signals shall be inaudible at any and all student recorders. Conversely, no audio bleed thru shall cause false control signals in any student recorder. Malfunction of a student recorder shall not affect instructor console operation or any other student recorder. (Optional)

5.1.10 Illuminated indicators shall advise the student when his recorder is in PROGRAM recording and is controlled from the console or when in DRILL function of library mode. f (Optional)

5.1.11 A service and maintenance manual shall be provided which shall include the following as minimum requirements:
a. Performance specifications
b. Alignment and adjustment procedures
c. Complete schematics showing any factor or local modifications made on the model (s) installed.
d. PC Board layout, both sides if applicable, and component identification.
e. Complete parts lists and part numbers.
f. Exploded assembly views showing all component parts and part numbers.

5.1.12 Specifications for student cassette recorder track configuration 4-track.

OR
track configuration-half-track.

Wow and flutter		0.15% wrms
Frequency response		50-10,000 Hz +/- 3dB
Signal to noise ratio		42dB
Inputs	Microphone	1
	Intercom	1
Outputs	Program	1
	Line	1
	Headset	1

All electrical and electronic connections shall be compatible with other system components.
The capstan, supply and take-up motors shall be of the direct drive type. (Not available on all brands of equipment)

5.2 STUDENT HEADSET/MICROPHONE_____Student headset/ microphones shall be provided by the seller. (It is suggested that at least five spare headsets be ordered for each thirty student positions)

5.2.1 The student headset/microphone shall be specifically designed for educational use and shall be of sufficiently rigorous construction as to withstand daily student use.

5.2.2 The headset/microphone shall be a dynamic, noise cancelling type.

5.2.3 Specifications for the headset/microphone

Earphone elements
frequency response 30-15,000 Hz +/- 3dB
sensitivity -90dB
Dynamic noise cancelling
The microphone shall be disconnected whenever it is placed in the extreme upright position.

6. Student Furniture

6.1 Student learning laboratory booths. There shall be_____positions of student learning laboratory booths provided. The configuration of the rows of booths shall be according to the accompanying diagram. The learning laboratory booths shall be specifically designed for educational use.

6.1.1 The student furniture shall be of the learning lab booth type with low (or "high) dividing panels separating the student positions. The dividing panel shall extend a maximum of 3-12" (or higher as desired) above the student work surface. There shall be provisions for the student learning lab equipment to be bolted in place. The booth should have a storage compartment located below the work surface to house headset and books when not in use (This is a desirable, but optional feature). A wireway shall be provided and accessed by removal of the booth rear panel. An opening between the storage compartment and wireway, large enough for a headset connector, but not large enough for a human hand, shall be provided.

6.1.2 The furniture shall be constructed of high pressure furniture board covered with a decorative plastic laminate. The face of the dividing wings, work surface and back panel should be_____in color with the remaining surfaces_____in color. The leg assemblies should be fabricated of 1" tubular stell vertical members with a 1" x 2" U-shaped closed end channel as a base. The leg assembly shall have a gloss Silathane finish. The entire booth shall be assembled with the use of black oxide decorative flat head joint connector bolts and nuts with hex drive.

6.1.3 The overall width of the booth working space shall be 30-1/8" and the depth shall be 23" and it shall be 29" above the floor.

Readings

Larsen, Jerry, ed. *Applications of Technology: Planning and Using Language Learning Centers.* Provo, Utah: The Calico Monograph Series, vol. 1, B.Y.U., 1986.

Dakin, Julian. *The Language Laboratory and Language Learning.* London: The University of London Press, 1968.

Stack, Edward. *The Language Laboratory and Language Learning.* New York: Oxford University Press, 1971.