

**SPECIFICATION  
FOR  
TEACHING CENTER, BUSINESS  
(MULTI-CHANNEL BUSINESS LABORATORY)**

(THIS SPECIFICATION IS RELEASED FOR PROCUREMENT PURPOSES UNTIL REVISED, OR RESCINDED.)

**SCOPE**

THIS SPECIFICATION IS INTENDED TO COVER A COMPLETE BUSINESS TEACHING CENTER TO DISTRIBUTE AUDIO PROGRAM MATERIAL FROM (1) MAGNETIC TAPES, (2) INSTRUCTOR'S MICROPHONE, AND (3) AUXILIARY (EXTERNAL) SOURCES. THIS CENTER IS INTENDED FOR USE IN THE TEACHING OF TYPING, SHORTHAND, AND OTHER BUSINESS SUBJECTS.

**I. CLASSIFICATION**

BUSINESS TEACHING CENTERS COVERED BY THESE SPECIFICATIONS ARE OF THE WIRELESS TYPE ONLY.

**II. APPLICABLE STANDARDS**

THE FOLLOWING DOCUMENTS OF ISSUE IN EFFECT ON THE DATE OF THE INVITATION FOR BIDS SHALL FORM A PART OF THIS SPECIFICATION:

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)  
AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).  
NATIONAL ELECTRICAL CODE (NEC).  
UNDERWRITERS' LABORATORIES (UL) STANDARDS AND LISTINGS.  
NEMA LP-2.

**III. REQUIREMENTS**

FUNCTIONAL CAPABILITIES SHALL INCLUDE THE FOLLOWING:

**A. GENERAL**

1. THE SYSTEM SHOULD BE SUITABLE FOR USE IN TYPICAL CLASSROOM UP TO 36 STUDENTS.
2. TO DISTRIBUTE AT LEAST FOUR INDEPENDENT PROGRAM CHANNELS FROM THE INSTRUCTOR'S POSITION TO THE CLASS MEMBERS.
3. TO ACCEPT A MICROPHONE INPUT DIRECTLY (-50 DBM NOMINAL LEVEL) FOR "ALL CALL".
4. TO ACCEPT AT LEAST ONE HIGH-LEVEL (0 DBM NOMINAL) AUXILIARY INPUT IN ADDITION TO THE MICROPHONE INPUT SPECIFIED IN III. A.3 FOR DISTRIBUTION TO THE CLASS AS ANOTHER AUDIO PROGRAM SOURCE.
5. TO CUT POWER SUPPLY TO ALL ELECTRONIC EQUIPMENT IN THE SYSTEM ON/OFF BY MEANS OF A MASTER SWITCH AT THE INSTRUCTOR'S POSITION.

6. TO PROVIDE PROGRAM SELECTION AND VOLUME CONTROL BY THE INSTRUCTOR, AND VOLUME CONTROL BY EACH INDIVIDUAL STUDENT AT THE HEAD SET.

**B. TRAINING**

UPON INSTALLATION OF THE CENTER, THE CONTRACTOR SHALL INSTRUCT THE REPRESENTATIVES IN THE OPERATION AND USE OF THE CENTER. THE INSTRUCTION PERIOD SHALL BE AT LEAST ONE 8-HOUR DAY. THE OWNER SHALL HAVE THE OPTION TO PAY FOR ADDITIONAL TRAINING TIME.

**C. MOBILE CABINET**

1. THE CABINET SHALL ACCOMMODATE AT LEAST FOUR RECORD/PLAYBACK UNITS 15" WIDE BY 10" DEEP BY 5" HIGH WITH AT LEAST 3" CLEARANCES IN ALL DIRECTIONS, OPERATING SWITCHES, AND JACKS FOR PLUG-IN OF ALL INPUTS AND OUTPUTS INCLUDING ALL WIRING, IN A MOBILE CABINET OF EITHER WOOD OR METAL CONSTRUCTION. THE CABINET SHALL PERMIT PASSAGE THROUGH A 32" DOOR OPENING. HEIGHT SHALL BE 28-40". THE LENGTH SHALL BE SUFFICIENT TO PERMIT THE INCLUSION OF ALL PRINCIPAL COMPONENTS AND PROVIDE AN ADEQUATE STORAGE COMPARTMENT FOR HEADSETS, TAPES, ETC. THE STORAGE COMPARTMENT SHALL BE PROVIDED WITH DRAWERS OR DOORS INCORPORATING LOCK AND KEY. CASTERS SHALL BE NO SMALLER THAN 4" IN DIAMETER WITH NON-MARKING TREAD AND LOCKING DEVICE ON AT LEAST TWO OF THE CASTERS. ENTIRE CABINET SHALL BE CAPABLE OF BEING CLOSED AND LOCKED WITH A SINGLE KEY.
2. IF OF METAL CONSTRUCTION, THE CABINET SHALL BE MADE OF FURNITURE GRADE STEEL NO LIGHTER THAN 18 US STANDARD GAUGE. PANELS OR SHEETS SHALL BE EMBOSSED, BRACED, OR OTHERWISE REINFORCED TO ELIMINATE COUPLING OR BUCKLING. FIELD JOINTS MAY BE BOLTED, WITH BOLTS CONCEALED AND JOINTS AS NEAT AND INCONSPICUOUS AS POSSIBLE. ALL EDGES, CORNERS, AND WELDS SHALL BE ROUNDED OR GROUND SMOOTH. THE ENTIRE FINISH SHALL BE BAKED ENAMEL IN MANUFACTURER'S STANDARD COLOR.
3. IF CONSTRUCTED OF WOOD, THE MATERIAL SHALL BE MEDIUM OR HIGH-DENSITY PARTICLE BOARD SUBSTRATE OR KILN-DRIED HARDWOOD NORMALLY USED IN FURNITURE MANUFACTURE, SUCH AS CLEAR MAPLE, BIRCH OR BEECH. IF PLYWOOD IS USED, IT SHALL BE LIMITED TO PANELS, SHELVES, OR CONCEALED CONSTRUCTION. THE EXPOSED SURFACE SHALL BE EITHER FINISHED HARDWOOD, SOLID WOOD, OR PLASTIC. IF PLASTIC, IT SHALL BE 0.06" (MINIMUM) THICK CLASS I, GENERAL PURPOSE TYPE DECORATIVE LAMINATE, MEETING THE REQUIREMENTS OF NEMA STANDARD LP-2, OF ISSUE IN EFFECT AT THE TIME OF THIS BID. THE CABINET SHALL BE OF RUGGED AND SUBSTANTIAL BUILD, WELL BRACED, USING CONVENTIONAL CONSTRUCTION METHODS. A GOOD GRADE OF RESIN OR ANIMAL GLUE SHALL BE APPLIED FREELY TO TENONS, DOWELS, AND DOVETAILS. ALL EXPOSED HINGES, LATCHES, LOCKS, OR OTHER METAL HARDWARE PARTS SHALL BE CHROME OR NICKEL PLATED.
4. ALL EXPOSED METAL OTHER THAN DECORATIVE TRIM MUST BE POSITIVELY GROUNDED BY MEANS OF A SEPARATE GROUND WIRE INCLUDED IN A THREE-WIRE GROUNDING CORD AND PLUG FOR CONNECTING TO A STANDARD AC WALL RECEPTACLE.

**D. CASSETTE RECORD/PLAYBACK UNITS**

1. CASSETTE UNITS SHALL BE STANDARD OFFICE COMBINATION DICTATION/TRANSCRIBING TYPE SUITABLE FOR PLACING OR MOUNTING ON THE INSTRUCTOR'S CABINET IN A FULLY ACCESSIBLE LOCATION ON THE UPPER MOST WORK AREA OF THE CABINET.

2. EACH CASSETTE UNIT SHALL CONNECT INTO THE SYSTEM BY MEANS OF A REMOVABLE PATCH CORD. JACK(S) ON THE CASSETTE DECK MUST BE OF A STANDARD TYPE, E.G. STANDARD PHONE JACK, AND INTERCONNECTING CABLE SHALL BE FURNISHED COMPLETE WITH APPROPRIATE PLUG(S) INSTALLED.
3. UNIT SHALL UTILIZE STANDARD SIZE CASSETTES.
4. BASIC UNIT SHALL BE FURNISHED LESS FOOT CONTROL, HEADSET AND HAND MICROPHONE, BUT THESE MUST BE AVAILABLE TO THE OWNER AS OPTIONAL, EXTRA-COST ITEMS.
5. MINIMUM CONTROL FUNCTIONS SHALL INCLUDE:
  - A. ON-OFF SWITCH.
  - B. SPEED - CONSTANT OR VARIABLE, UNDER OPERATOR'S CONTROL.
  - C. VOLUME CONTROL AND/OR ALC.
  - D. REWIND.
  - E. FAST FORWARD, WITH POSITION INDICATION SLIP OR DIGITAL COUNTER.
  - F. OPTIONAL HAND MICROPHONE SHALL HAVE RECORD, REWIND, LISTEN, AND STOP FUNCTIONS AS A MINIMUM.
6. IT IS INTENDED THAT CASSETTE UNITS WILL BE SELF-CONTAINED AND SIMPLY PLACED ON OR IN THE CABINET WHEN IN USE. PERMANENT MOUNTING OF TAPE DECKS IN THE CABINET IS NOT REQUIRED.
7. FREQUENCY RESPONSE 100 - 5,000 HZ WITHIN 3 DB (REFERENCE 1 KHZ @ 0 DB).
8. TAPE FORMAT: MONAURAL HALF-TRACK.
9. UNIT SHALL BE UL-LISTED.
10. FOR 120 VAC, 60 HZ POWER INPUT.

**E. TRANSMITTER**

1. THE TRANSMITTER SHALL BE OF MODERN DESIGN AND IN KEEPING WITH THE PURPOSE FOR WHICH IT IS TO BE USED.
2. THE WIRELESS SYSTEM SHOULD CONCENTRATE THE GREATEST RADIATION POSSIBLE WITHIN THE TARGET AREA WITHOUT EXCEEDING FCC REGULATIONS.
3. AT LEAST FOUR SEPARATE FREQUENCY CHANNELS SHALL BE FURNISHED, WITH PROVISION FOR FURNISHING FOUR ALTERNATE CHANNELS IN THE EVENT OF INTERFERENCE OR PROGRAM CHANNEL EXPANSION.
4. THE OUTPUT FOR BOTH FUNDAMENTAL FREQUENCY AND HARMONIC RADIATION SHALL BE EQUAL TO OR LESS THAN THE MAXIMUM SET BY THE FCC RULES, PART 15, SUB-PART E.
5. INPUTS FOR BOTH LOW-LEVEL (E.G., MICROPHONE) AND HIGH-LEVEL (E.G., TAPE RECORDER OUTPUT) AUXILIARY SOURCES SHALL BE PROVIDED.
6. A VISUAL INDICATOR FOR PRESENCE AND RELATIVE LEVEL OF MODULATION SHALL BE PROVIDED FOR EACH CHANNEL.
7. A LOOP ANTENNA, WHOSE FUNCTION SHALL BE TO PRODUCE AND LIMIT RADIATION TO THE TARGET AREA, SHALL BE FURNISHED AND INSTALLED OUT OF REACH OF STUDENTS. ANTENNA SHALL BE INSTALLED IN THE LENGTH REQUIRED, AND WITH NECESSARY FIXTURES INCLUDING WALL PLUG AT TRANSMITTER LOCATION.

8. TRANSMITTER CASE SHALL BE OF METAL HIGH-IMPACT PLASTIC. THE ENTIRE UNIT SHALL BE PORTABLE.
9. PROVISION SHALL BE MADE FOR THE INSTRUCTOR TO CALL ANY OR ALL CHANNELS AND LISTEN TO EACH PROGRAM BEING TRANSMITTED.
10. AUTOMATIC GAIN CONTROL SHALL BE INCORPORATED, TO PROVIDE CONSTANT LEVEL, HIGH QUALITY TRANSMISSION WITHOUT THE NEED OR THE INSTRUCTOR TO ADJUST GAIN OR VOLUME. PROGRAM OR VOICE INPUT LEVEL SHOULD BE AUTOMATICALLY COMPENSATED OVER A MINIMUM RANGE OF 40 DB.
11. INTER-CHANNEL CROSSTALK SHALL BE BELOW NOISE LEVEL. INTER-CHANNEL INTERFERENCE SHALL BE SUPPRESSED AT LEAST 60 DB.

**F. RECEIVERS**

1. AT LEAST FOUR FREQUENCIES, COORDINATED WITH THE TRANSMITTER FREQUENCIES, SHALL BE PROVIDED, WITH SWITCH SELECTOR.
2. THE RECEIVER SHALL HAVE A CONTROL FOR VARYING STUDENT EARPHONE VOLUME.
3. RECEIVER SHALL BE ALL SOLID-STATE DESIGN, WITH AGC CIRCUITRY.
4. ONE STETHOSCOPE-TYPE HEADPHONE SET SHALL BE PROVIDED WITH EACH RECEIVER.
5. RECEIVER SHOULD INCORPORATE SOME MEANS OF AUTOMATIC CUT-OFF AND, ALSO, A MANUAL CONTROL.
6. BATTERY COMPARTMENT AND RECEIVER'S ELECTRONIC SECTIONS SHALL NOT BE EASILY ACCESSIBLE BY STUDENTS.
7. EXPECTED BATTERY LIFE SHALL BE AT LEAST 500 HOURS UNDER NORMAL OPERATING CONDITIONS, WITH COMMONLY AVAILABLE BATTERY TYPE SUCH AS 9-VOLT TRANSISTOR BATTERY.

**G. HEADSET RECEIVERS**

SAME SPECIFICATIONS AS FOR RECEIVERS (ITEM III.F), EXCEPT COMPLETE UNIT SHALL BE SELF-CONTAINED IN AN OVER-THE-HEAD TYPE SET, AND MINIMUM REQUIRED BATTERY LIFE IS 200 HOURS.

**IV. WARRANTY**

THE CONTRACTOR WARRANTS TO THE OWNER THAT ALL EQUIPMENT FURNISHED UNDER THIS SPECIFICATION WILL BE NEW, OF GOOD MATERIAL AND WORKMANSHIP AND AGREES TO REPLACE PROMPTLY ANY PART OR PARTS WHICH BY REASON OF DEFECTIVE MATERIAL OF WORKMANSHIP SHALL FAIL UNDER NORMAL USE, FREE OF NEGLIGENCE OR ACCIDENT, FOR A MINIMUM PERIOD OF 12 MONTHS FROM DATE OF ACCEPTANCE. SUCH REPLACEMENT SHALL BE FREE OF ANY CHARGE TO THE OWNER OR HIS REPRESENTATIVE.

**V. MANUALS**

TWO SETS OF COMPLETE OPERATION AND SERVICE MANUALS ARE TO BE FURNISHED WITH EACH BUSINESS TEACHING CENTER.

**VI. ACCEPTANCE INSPECTION AND TESTING**

AN ACCEPTANCE INSPECTION OF EACH CENTER WILL BE CONDUCTED BY THE STANDARDS & INSPECTION SECTION OF THE PURCHASE AND CONTRACT DIVISION PRIOR TO RELEASE OF PAYMENT. ACCEPTABLE CONDITION OF THE CENTER IS DEEMED TO INCLUDE:

1. NO DETECTABLE DEFECTS IN MATERIAL AND WORKMANSHIP.
2. ERECTION, ASSEMBLY, AND MOUNTING OF ALL COMPONENTS IN PLACE READY FOR OPERATION.
3. TRAINING OF THE PURCHASER OR HIS REPRESENTATIVES IN THE FULL USE OF THE SYSTEM.
4. COMPLIANCE OF OPERATION WITH THE PERFORMANCE SPECIFICATIONS CONTAINED HEREIN.

**VII. DELIVERY AND PAYMENT**

DELIVERY OF AND PAYMENT FOR EQUIPMENT UNDER THIS SPECIFICATION SHALL BE IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE INVITATION FOR BIDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY PACKING, PACKAGING, OR PROTECTION REQUIRED TO INSURE DELIVERY IN AN UNDAMAGED CONDITION.

**VIII. ORDERING DATA**

PURCHASERS SHOULD EXERCISE ANY DESIRED OPTION OFFERED HEREIN AND SHOULD SPECIFY THE FOLLOWING IN THE REQUISITION AND INVITATION FOR BIDS: 1. TITLE, NUMBER AND DATE OF THIS SPECIFICATION.