

S P E C I F I C A T I O N

for

ANIMATION & EXHIBIT SOUND SYSTEMS

NEW YORK WORLD'S FAIR EXHIBIT 1964-1965

FORD MOTOR COMPANY

DEARBORN, MICHIGAN

July 5, 1963

△ Notes Revisions Issued July 12, 1963

A WALT DISNEY CREATION

Exhibit Designed by

WED ENTERPRISES, INC.

800 Sonora Avenue

Glendale 1, California

N O T I C E

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WED ENTERPRISES, INC.

800 Sonora Avenue, Glendale 1, California

- Any party accepting this document does so in confidence and
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NOTICE
ANIMATION & EXHIBIT
SOUND SYSTEMS

FORM OF PROPOSAL

NAME OF BIDDER GLEN GLENN SOUND EQUIPMENT, INC.

ADDRESS 6624 Romaine Street PHONE HOLLYWOOD 9-7221
Hollywood, California

INSTALLATION AND EQUIPMENT CONTRACT

at Flushing Meadow Park, Queens, New York,

Date Aug. 12 1963

The undersigned, hereinafter referred to as the Contractor, proposes to furnish all labor, materials, tools, miscellaneous items, equipment and supervision required to provide sound system components for installation in the New York World's Fair Exhibit 1964-1965 at Flushing Meadow Park, Queens, New York, for the Ford Motor Company, Dearborn, Michigan, hereinafter referred to as the Owner in strict accordance with the Owner's General Conditions, Specifications and Drawings, as prepared by WED Enterprises, Inc., 800 Sonora Avenue, Glendale 1, California, for the lump sum firm price of (\$ _____),

DOLLARS

which sum includes all taxes, of whatever character or description, except sales or use taxes on property to be transferred to Ford Motor Company. This is a base bid using named components.



MAJOR SUBCONTRACTS SCHEDULE

The Contractor proposes to award major subcontracts in accordance with the following schedule, and has included the amounts of such subcontracts in the aforementioned lump sum proposal.

<u>SUBCONTRACT</u>	<u>PROPOSED SUBCONTRACTOR</u>	<u>SUBCONTRACT AMOUNT</u>
_____	_____	_____
_____	_____	_____

No base bid using named components is made. See
alternate bid using substitute components.

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Any price benefit resulting from changes in the subcontractors listed above shall be credited by Contractor to Owner. Changes of sub-contractors shall require the written approval of the Owner.

ALTERNATE PRICE SCHEDULE

The Contractor proposes alternate prices in accordance with the following schedule for additions to or deductions from the lump sum proposal.

	NONE PROPOSED	<u>ADDITIONS</u>	<u>DEDUCTIONS</u>
Alternate #1		_____	_____
Alternate #2		_____	_____

FEES

Contractor's cost computation of additions to or deductions from the work, prepared in accordance with Method No. 2 of Owner's General Conditions, shall show as separate items, payroll taxes and payroll insurance costs, and sales and/or use taxes, which items shall be excluded from the amounts to which percentage fees, if any, shall be applied. The percentage fees applicable to the cost of additions to or deductions from the work shall be as follows:

<u>SUBCONTRACTOR</u>	Percentage fee which shall constitute the employing contractor's full compensation for all burden, overhead and profit on work performed by Contractor's own forces.	Percentage fee applied to net total of next lower subcontractor's charge, which shall constitute full compensation for handling sub-contract work.
Technical Products Engineering Company	G & A - 10%, plus profit - 10% of total	_____ %
J. Livingston & Company	Information not available at time of bid submission.	_____ %

TIME OF COMPLETION

The Contractor proposes to complete all installation work within one hundred and fifty (150) calendar days (Saturdays, Sundays and Holidays included) from the date of award of the Contract, with project to be completed by December 31, 1963.

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Said unit prices shall be applicable to the pricing of deletions from or additions to the work shown on the Contract drawings or called for in the Contract Specifications, and shall not be adjusted in respect to work (authorized in writing by Owner) which, although different from work shown on said drawings or specifications, is reasonably similar thereto. Said unit prices shall be practically related to the determination of such additional unit prices as may be required from time to time.

Prices shall include packaging, and transportation to Exhibit Building - New York World's Fair.

UNIT PRICES

- ES-1 Provide one open frame welded steel panel rack set in place with 2"x4" wood sleepers anchored to floor beneath it, with 19"x19"x1" base plate, and vertical frame rising to 75". Provide #10/32 tapped mounting holes on universal centers approximately 2" on centers. All steel 1/8" minimum thickness, cleaned and primed, and finished gray hamertone. Maximum weight 41 pounds. Provide on left hand rear side of vertical frame a 120 volt plus ground wire-mold receptacle strip with outlets on six-inch centers. Wyco Metal Products Co. Cat. No. RC-71. \$ 19.57
- ES-2 Provide one Audio-amplifier set in place, and secured in an existing open frame welded steel panel rack. Include input and output connections to existing wire in adjacent wireways, and 120 volt 3-wire grounding cord and cap plugged into adjacent wire-mold receptacle.
- (a) One 40 watt 120 volt Altec-Lansing Corp. Model No. 1568-A amplifier, with one No. 15095 transformer. \$ 170.30
- (b) One mixing pre-amplifier with four microphone inputs, one auxiliary input, impedance matching taps, master-gain-control, bass and treble control, D-C heated tube filaments. 20 to 20,000 CPS frequency response. Altec-Lansing Corporation Model No. 342-B. \$ 276.56
- ES-3 Provide one 70.7 volt line impedance matching transformer for 8, 16, or 32 watts output, with Cinch-Jones plug attached to appropriate terminals and plugged in to existing audio receptacle. Provide connection to existing adjacent loudspeaker. Peerless Division Altec-Lansing Corp. Cat. No. 15066. \$ 15.60
- ES-4 Provide one loudspeaker of characteristics described in detail in specifications, mounted in existing enclosure on ceiling or wall, and connected to adjacent existing 70.7 V. line transformer.
- (a) One Altec-Lansing Corp. Cat. No. 415 Loudspeaker \$ 54.05
- (b) One Altec-Lansing Corp. Cat. No. 412 Loudspeaker \$ 46.35
- (c) One Altec-Lansing Corp. Cat. No. 755 Loudspeaker \$ 25.75

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Said unit prices shall be applicable to the pricing of deletions from or additions to the work shown on the Contract drawings or called for in the Contract Specifications, and shall not be adjusted in respect to work (authorized in writing by Owner) which, although different from work shown on said drawings or specifications, is reasonably similar thereto. Said unit prices shall be practically related to the determination of such additional unit prices as may be required from time to time.

Price shall include packaging, and transportation to Exhibit Building New York World's Fair.

UNIT PRICES (Bidder Fill in Descriptions)

ES-1 One Substitute Welded Steel Panel Rack: NO ALTERNATE

Make _____ \$ _____

ES-2 One Substitute Audio-Amplifier: NO ALTERNATE

Make _____ \$ _____

ES-3 One Substitute Matching Transformer: NO ALTERNATE

Make _____ \$ _____

ES-4 One Loudspeaker:

(a) Make	NO ALTERNATE	Size 15"	\$ _____
(b) Make	NO ALTERNATE	Size 12"	\$ _____
(c) Make	NO ALTERNATE	Size 7"	\$ _____
(d) Make	NO ALTERNATE	Assembly	\$ _____
(e) Make	NO ALTERNATE	horn	\$ _____

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(d) One Altec-Lansing Corp. Cat. No. A-7 Loudspeaker \$ 239.38

(e) One University Co. Horn, Cat. No. CML-A Loudspeaker \$ 15.31

ES-5 Provide one magnetic tape playback machine with modifications described in detail in specifications, mounted in an existing rack, with relay-control connections, audio output connections, and 120 volt plug-in connection, to existing adjacent wireway.

(a) One 14-channel reproducer, 3 3/4"/7 1/2" inches per sec. tape speeds, 115 volts, 60 cycles, 275 watts, 10 1/2 diam. reels, 1" wide, 0.050" track width, 2 1/2 minute rewind, size 16 1/2" x 26 1/2" x 13 1/4" and 105 pounds weight. MIL E-4158E finish. Solid state electronics, response 300 to 7,500 cycles per sec., 0.1% RMS flutter. Precision-Instrument Company Model PS-214A. \$ See alternate
1011 Commercial Street, San Carlos, California

(b) One six-cartridge repeating-reel playback reproducer console, size 12" x 12" x 12", with plug-in stacked cartridges. 3 3/4"/sec tape speed, 115 volts, 60 cycles, 375 watts, 1400 foot tape loop, remote control operation, low level input 50/2000 ohms, output 600 ohms, (+) 10 D B M. Response 50 to 10,000 CPS with 50 DB signal-to-noise ratio. Solid state electronics. KRS Electronics Company, 4035 Transport Street, Palo Alto, California
Cat. No. KRS-STACT-6. Includes 6 cartridges, \$1,112.15
each loaded with 1400 feet of tape.

(c) One, three-channel stereo magnetic tape reproducer size 19" x 24 1/2" x 8 3/4", weight 79 pounds, tape speeds 3 3/4"/7 1/2" per sec., 14" x 1/2" reels, 0.2% flutter, response 50 to 7500 c.p.s. for 1 1/2 D. B. remote control. Solid-state electronics, amplifier output (+) 18 DBM, 600 ohm line. Distortion 0.5%. 24 volt D-C controls. Scully Recording Instruments Corp., 480 Bunnell St., Bridgeport, Conn., Model No. 270. \$ See alternate

ES-6 Provide 4" square hinged cover steel wireway attached to existing frame racks, or to existing wall, at approximately (+) 8 feet, with one elbow assumed per 10 foot length, ready for placement of wires and cables.
One 10 foot length wireway \$ 22.50

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ES-5 Provide One Playback Machine:

S- ek

(a) Make Ampex Model # 3-6067. One 12-channel ~~reproducer~~
nel synchronous, interlocked, 35 mm. magnetic reproducer
and associated 500-foot enclosed loop cabinet.

\$ 10,059.30

(b) Make NO ALTERNATE 6 cartridge, Repeating.

\$ _____

(c) Make Ampex Model # 309-03-01 3 channel stereo
One 1/2-inch magnetic tape reproducer
which will equal specifications for
named Scully reproducer

\$ 3,185.00

ES-6 Provide 4" Square Wireway:

NO ALTERNATE

\$ _____

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ADDENDUM TO PROPOSAL OF
GLEN GLENN SOUND EQUIPMENT, INC.

The proposal of Glen Glenn Sound Equipment, Inc. is made subject to the following conditions. To the extent that the conditions hereinafter set forth are contrary to or inconsistent with any provision or condition elsewhere in this proposal contained, the following shall be controlling:

1. Each and all of the general conditions contained in Ford Motor Company General Conditions for Lump Sum Construction Contracts (Form 3645 PLT ENGR Jan. 57) which are of a character that have no application to this proposal shall be deemed not to constitute a part hereof.

2. In connection with reproducers, the Contractor proposes to use four Ampex S6067 twelve track interlock machines operating at 45' per minute, mounted in four enclosed equipment racks equipped with plexiglass doors and operating in conjunction with four similarly enclosed loop cabinets. All of these machines would be arranged to operate in interlock, which would provide a total of 48 tracks, all of which would bear a real time relation to each other. The intention is, under normal conditions, to operate three of the machines in interlock, providing 36 synchronous sound tracks and to use the fourth machine in cases of emergency. During emergency operation, the 12 synchronous tracks on the fourth machine would be transferred by relays to pre-selected areas in the building. All of these mater 12 track reproducers would work into loop cabinets containing approximately 500' of fully coated 35 mm Mylar base perforated magnetic film. This provides continuous operation without the necessity of rewinding. Contractor believes that this is the most practical arrangement since it will provide a larger number of synchronous sound tracks, would be more reliable, and should require less manpower to operate. The recorded material will be reproduced at 9" per second as contrasted to 7-1/2" per second with the previously proposed Precision Instrument Company's equipment and will, therefore, provide superior sound quality.

Contractor's analysis indicates that, having additional synchronous sound tracks available, it will be possible to eliminate three of the KRS 6 Cartridge Repeating Reel Playback Reproducers and four of the Scully stereo tape reproducers.

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One pair of three track stereo tape reproducers would still be required. Contractor proposes using the Ampex rack mounted type 309-03-01 Unit in the belief that it offers performance and reliability superior to that provided by the Scully equipment. The cost of the Ampex equipment is approximately 15% higher; however, in the overall operating plan which Contractor recommends, there is a substantial saving in total equipment costs.

3. The buildings in which the equipment which is the subject of this contract is to be installed are presently under construction, and Contractor has had no opportunity to view said premises prior to the presentation of this proposal. The electronic equipment which is the subject of this contract requires proper environment for satisfactory installation, and in particular, cleanliness in work areas and avoidance of possible physical damage or injury to the equipment during the process of installation. Contractor will be unable to commence said installation work until the environmental conditions are met. This proposal contemplates that upon commencement of the installation work, the Contractor shall have free access to all work areas, without unreasonable interference, until the installation work is completed. This proposal is based upon a 7-hour 5-day week labor cost. No overtime allowance or allowance for idle time has been included. Contractor estimates completion within 150 days after award of the contract. Shipment of equipment to the job site shall begin approximately 30 days after the award of the contract. The completion date shall be extended for a period equal to the aggregate period of any delays caused by the job site not being ready for installation of equipment by Contractor at any time following the thirty-first day after the contract is awarded.

4. All custom-built equipment proposed to be furnished hereunder will be constructed in accordance with generally accepted industry practices. It is expressly noted, however, that insufficient time or opportunity is available to Contractor to enable it to secure formal approvals of the design, materials or construction of custom items by any of the entities referred to in paragraph 4 of said Ford Motor Company Form 3645.

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5. This proposal is submitted subject to the understanding by Contractor that J. Livingston & Company is duly licensed as a contractor under the laws of the State of New York, and that Contractor will not be required to be so licensed in connection with the performance of the proposed contract, including installation work proposed to be performed by its subcontractor, J. Livingston & Company.

6. The owner shall provide 60-cycle A.C. electricity, in both 240-volt, 3-phase, and 110-220-volt, single phase, as required at points of installation of equipment.

7. This proposal does not include the costs of watchmen, toilet requirements, temporary light and power, cleanup dust control or other janitorial work.

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SPECIAL REQUIREMENTS

GENERAL: The provisions of the section on General Conditions are supplemented and modified by the Special Requirements; and, like the General Conditions, are a part of the several trade sections of the specifications with the same force and effect as though fully repeated in each section. The provisions of this Section supersede conflicting or contradictory provisions occurring in General Conditions.

BACKGROUND DATA: Exhibits are viewed by visitors who travel through various areas on foot, on moving up and down ramps, and seated in automobiles traveling along two tracks. The sound system fulfills several functions by providing background music in selected areas, musical entertainment in selected areas, sound-effects associated with exhibit, animated figures and objects, public-address announcements, and emergency announcements. In addition, the actual animation of certain small objects (such as caveman-mouth-movements) in synchronism with the sound-effects, is performed by the sound system.

The source of sound is primarily from multi-channel magnetic tape playback machines located in two sound rooms. These also house all necessary amplifiers, relays, and associated equipment mounted in floor standing racks. Certain playback machines are of the continuously repeating, endless-cartridge type which run during all hours the exhibits are open. Other machines must be stopped and rewound automatically at the end of each reel; for these, a second standby machine is required which runs alternately with the first machine.

Conduit, wire, and loudspeaker recessed boxes or outlets installed under another contract, provides inter-tie from Sound Room Terminal Blocks to remote speaker and animation equipment locations. In this contract provide and install and connect loudspeakers shown on plans.

The magnetic tape machines for narration of the ride and which are mounted in each of the cars on the tracks are in a separate contract not associated with this work.

At selected locations desk-top microphones permit authorized personnel to make public-address announcements and communicate emergency messages by pressing a microphone button which reaches all horns and speakers for the Track Areas, and another button for all horns and speakers in the other Exhibit Areas.

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SCOPE OF WORK: Covered by this Contract is described in detail in the section entitled "Sound System Work."

JOB SITE CONDITIONS: Work in the same areas involved in this contract is currently underway with other contractors and will continue intermittently during the construction period assigned for this work. Coordination with other trades in the scheduling of work is mandatory, and will require the most careful planning to ensure lighting and power requirements are available on time.

GENERAL CONDITIONS: Refer to Page 13 - Article 29. Delete in its entirety and substitute the following in lieu thereof:

"29. **INSURANCE:** The Contractor shall procure, maintain and require its subcontractors at the site to procure and maintain with companies acceptable to the New York World's Fair 1964-1965 Corporation, and before starting work shall provide owner and New York World's Fair 1964-1965 Corporation with certificates evidencing insurance in amounts and with coverages as set forth below:

(a) **Liability Insurance:** Coverage shall include operations (including standard form, libel, slander, false arrest and other usual personal injury insurance); elevators and escalators; Owner's and Contractor's protective; and contractual; to the termination date and acceptance of all work to be performed under this contract in at least the following amounts:

(1) **Bodily Injury Liability**
\$ 250,000 each person
1,000,000 each occurrence

(2) **Property Damage Liability**
\$100,000 each person
200,000 each occurrence
200,000 each contractual

(b) **Automobile Liability Insurance:** Including all owned, non-owned or hired vehicles, with limits of not less than:

(1) **Bodily Injury Liability**
\$100,000 each person
300,000 each accident

(2) **Property Damage Liability**
\$ 50,000 each accident

(c) **Workmen's Compensation Insurance:** All Contractors and Subcontractors must comply with Chapter 41 of the New York State Laws of 1914, as amended, known as the New

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York Workmen's Compensation Law, including Article 'a' thereof, commonly referred to as "Disability Insurance Law." If Contractor or any of his Subcontractors is qualified as a self-insurer by the Industrial Commission of the State of New York, he must file with the Fair Corporation and Owner a certificate from the Department of Labor certifying that such privilege has been granted in lieu of a certificate of insurance issued by an insurance carrier.

- (d) The Furnishing of the Foregoing Certificates of Insurance, or evidence of self-insurance, however, shall not operate to relieve the Contractor from any liability or obligation for which he would otherwise be responsible under this Contract."

WATCHMEN: This Contractor shall employ a sufficient number of men to guard and protect his work at the site at all times outside of regular working hours until the complete work is turned over to the Owner.

NUMBER OF WORKING DRAWINGS AND SPECIFICATIONS: Article 13 of the General Conditions is amended hereby. In lieu of ten sets of blue-line prints, the Contractor shall receive five sets of blue-line prints and one ozalid transparency of all drawings for construction and for each bulletin.

FINISH PAINTING: Finish painting (other than shop painting and field touch up other than that noted in the various sections) is not a part of this Contract.

SUBSTITUTION: "Or equal" items may be substituted only after approval by the Ford Motor Company and WED Enterprises, Inc. (Refer to par. 5.06 for details)

ADVERTISING PRIVILEGES: The Contractor shall not display any signs, posters, or other advertising matter in or on the work or at the site without the specific approval in writing of the Resident Engineer.

ADMISSION TO FAIR SITE: All agents, representatives, and employees of the Contractor and all Subcontractors whose duties require their presence at the work are required to procure passes to the Fair Grounds. Procure passes for all trucks and equipment admitted to the Fair Grounds. Passes will be issued by the Director of Maintenance and Security of the Fair Corporation who has the right to reject any applications or to cancel an issued pass at any time; provided, however, that such passes shall not be unreasonably withheld or canceled.

PROJECT TIME SCHEDULE: The work under the Animation and Exhibit Sound System Contract shall commence immediately upon award of the Contract and be complete within 150 calendar days from date of award of Contract. The remaining work shall be complete by December 31, 1963. It is imperative this schedule be maintained to allow sufficient time for the Owner's occupancy.

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CONFORMANCE TO CODES AND REGULATIONS: All work and materials shall conform to the New York World's Fair 1964-1965 Corporation Building Code and any other governing bodies having jurisdiction.

ACCEPTANCE OF SITE: by this Contractor from the Superstructure Contractor shall indicate his approval of site conditions. If this Contractor does not approve the site, satisfactory arrangements for correction of conditions shall be made through the Resident Engineer.

SEPARATE CONTRACTS: The Owner has previously awarded contracts for the following items of work on other portions of the building:

- (a) Structural Steel American Bridge
- (b) Metal Roof Decking R. C. Mahon Company
- (c) Substructure Contract Hageman & Harris Fair Co., Inc.
- (d) Superstructure Contract Thompson & Starrett
- (e) Exhibit Building
No. of Column 9 Taylor & Caskin

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SECTION 4

LIST OF DRAWINGS

<u>Drawing No.</u>	<u>Title</u>
WE - 80	Loudspeaker Outlets First Floor Plan
WE - 81	Loudspeaker Outlets Second Floor Plan
WE - 82	Sound Room, P & T Building, Rack Plan and Elevations
WE - 83	Sound Room, Exhibit Building, Rack Plan and Elevations
WE - 84	Sound System Block Diagram Pavilion Building
WE - 85	Sound System Block Diagram Tunnel and Exhibit Building
WE - 86	" Sound System Block Diagram Exhibit Building & Unloading Zone
WE - 87	Sound System Block Diagram P & T Building

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SECTION 5

SOUND SYSTEM WORK

5.01 GENERAL: Requirements of the foregoing sections apply in full to work performed under this Section.

This is an abbreviated specification in which the words, "perform," "do," "install," "furnish," "connect," mean the same as if preceded by the words, "The Contractor shall." The word "provide" means furnish, install and connect, unless specifically modified in any given sentence.

5.02 SCOPE OF WORK: Refer to drawings and perform the following work providing all labor and supervision, and furnishing all materials, equipment and apparatus not designated as furnished by Owner:

- (a) ~~Procure, assemble and install individual open-frame steel racks, cabinets, and enclosures, and mount them in the two sound equipment rooms. Anchor wood runners to floor slab, and secure rack bases to wood runners.~~
- (b) ~~Provide basic components including terminal blocks, combining networks, amplifiers, pre-amplifiers, line-transformers, multi-channel magnetic-tape, playback machines and repeating-cartridges; mounting them securely by suitable brackets and straps into the steel racks.~~
- (c) ~~Procure, assemble, and install relays, transfer-relays, rectifiers, transformers, chokes, resistors, capacitors, meters, pilot-lights, cables and jacks, into control components such as may be required to provide continuous automatic supervision over all functioning items, including tape-playback machines, start-stop-rewind-transfer-and restart operation.~~
- (d) Provide wireways above racks running to terminal boards on wall, and provide 120 volt grounding receptacles and circuits on rear of each rack rising to conduit interconnections, also wireway returns to 120/208 volt panel board on wall. In Exhibit Building Sound Room, the panel is existing and believed adequate.

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In P & T Building Sound Room, the panel does not exist and is required in this contract; together with its home-run conduit, wire, and boxes. A feeder-circuit-breaker does exist suitable for serving this panel.

- (e) Provide wire, cable, conductors, connectors, plugs and jacks, push-button and toggle-switches labeled and numbered; and interconnecting all components so as to provide complete and working Sound Equipment Rooms,

Select taps and components to operate on a 70.7 volt (124 ohm) high level audio distribution system.

Provide a 1.0 volt zero DBM system for playback machine outputs, and pre-amplifier microphone circuits. Use 24-volt D-C control-relay circuits and systems.

- (f) Provide permanently mounted Sound-Room monitoring loudspeakers, tee-pad attenuating connections, and clip-on lead-connections for assistance in maintaining equipment. Locate one on each playback machine rack and one on each terminal-board.

- (g) Provide impedance matching line transformers, plug connectors, loudspeakers, speaker-grills or baffles, and connections to existing conduit and twisted-pair conductors.

- (h) Provide microphones, table-stands, push-to-talk switches, transfer relays, and connections to permit normal public-address, and emergency calls to be heard in selected areas.

- (i) Provide tape storage equipment cabinets, and spare component storage cubicles, properly labeled and indexed.

- (j) Receive copies of master program multi-channel magnetic tapes from WED Enterprises, Inc., on a no-charge basis. Rewind, splice, test, and demonstrate all details and functions of the sound systems to Resident Engineer; to Art Directors, and to Operating Personnel prior to final acceptance.

- (k) Wire-mesh fence-and-gate separation of sound racks from other facilities in P & T Building Sound Room.

Connect and install each of the foregoing components and cables in a manner to ensure accurate sound fidelity, static-free and hum-free signals for the amplified audio output fed to remote loudspeakers.

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5.03 WORK NOT INCLUDED:

Work required in the entire project, but not in this contract portion thereof, is as follows:

- (a) Master magnetic-tapes, which are WED furnished.
- (b) Panelboard in Exhibit Building Sound Room only, which is existing.
- (c) Lighting fixtures and maintenance receptacles in Sound Rooms, which exist.
- (d) Ventilation and air-cooling of Sound Rooms, which exist.
- (e) Audio-system conduit, boxes, jacks, wire; and loudspeaker enclosures in ceilings, installed in another contract from terminal-boards to outlets.
- (f) Audio-system and animatronic control system distribution conduits, boxes, wire and jacks installed in floors under a prior contract.

5.04 GUARANTEE:

On all items of material and on all labor performed under the work of these contract documents, provide written guarantee that any and all defects revealed within one year after their acceptance by the Owner will be repaired, replaced, or made good without cost to the Owner. Shipment to and from the site for items requiring repair shall be paid by Contractor.

Extend Manufacturer's Component Guarantees and Warranties to Owner with certificates and documents indexed and bound in a convenient reference loose-leaf booklet, clearly labeled and dated.

5.05 EQUIPMENT AND INSTALLATION:

In accordance with the best trade practices; assemble, install, connect all equipment shown on drawings or described in specifications, including the following:

- (a) In designated sound equipment rooms anchor fungicidal treated wood sleepers to floor establishing a level and straight base on which to mount equipment racks.

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(b) Install open-frame steel racks 19" x 19" x 75" of 1/8" thick formed and welded steel finished in gray hammertone enamel or lacquer, and anchor with 4 flathead galvanized steel woodscrews 1/4" x 1-1/2" per rack. Install on left rear vertical frame member of each section a 72" length of 120 volt surface metal raceway and receptacle strip containing 3 #12 conductors and grounding type 15 ampere receptacles on 6" centers. Provide pre-tapped #10/32 mounting holes in rack. Label rack by number 1" high at top of frame and note its function and area connected thereto. Provide WYCO Metal Products Company Cat. No. RC-71 Rack, with Wire-Mold Company #2000 - 20 GE06 wireway.

(c) Mount in designated racks, the appropriate components supported on supplementary brackets where required, and retained by cadmium-plated screws, lockwashers and nuts. Using plug-in connectors in lieu of soldered-joints, and screw-head terminal strips, make input and output connections to wire and cable running to terminal boards and to adjacent equipment. Objective is to facilitate rapid replacement of unit in the event of failure. Plug 3 conductor grounding cord and cap into adjacent 120 volt receptacle, leaving only a few inches of slack in cord length.

(d) COMPONENTS

(1) AMPLIFIERS: (Audio-power type - 120 volt 60 cycle A-C) Mount not more than six amplifiers in any one vertical rack with 3 conductor #16 type 50 cord and grounding-plug connection to 120 volt receptacle for each amplifier.

Basic amplifier is rated 40 watts secondary output at 70.7 volts, or at 25 volts, for connection to output loads of 4, 8, 16 (25v) and 124 ohms (70v) ungrounded. Chassis for rack mounting, with green enamel face plate, not to exceed 8-3/4" height, x 19" width, x 7-3/4" deep, and weight 22 pounds. Provide an ON-OFF switch, fast acting cartridge fuse, and pilot light to show when the 117 volt supply is ON. Consumption at full load of 125 watts is acceptable.

Over the frequency range of 40 to 20,000 cycles do not exceed 2% total harmonic distortion. Limit internal noise level to 80 decibels below rated output, and provide a normal gain of not less than 65 decibels. Limit output impedance to less than 15% of nominal load impedance. Input sensitivity is 0.9 volts maximum

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for rated output, with a 70,000 ohm volume control on the input circuit. Provide a low frequency cut-off filter circuit giving up to 22 decibels of attenuation at 250 cycles to protect horn driven speakers. Provide tube complement of two 6CG7, two 6A7/EL34, and one 5U4GB.

Provide plug-in impedance matching transformer Cat. No. 15095 for connection to 150 or 600 ohm source. In output transformer provide a tertiary winding for proper regulation through feedback control. Provide ALTEC-LANSING CORP. Model No. 1568-A amplifier.

- (2) PRE-AMPLIFIERS: (Audio-Signal, mixing type) Mount preamplifiers in vertical rack to receive microphone signals for public-address and emergency all-call systems. Connect inputs from four microphone stations per unit, and connect output via transfer relays to amplifiers for music and horn loudspeakers. Required features include:
- 4 - mixer controls, 1 - master volume control, 1 - bass & 1 - treble equalizer controls, pilot light, ON-OFF switch; panel indexed and identified.
 - Built-in matching equipment so any mixer position is suitable for high or low impedance microphones.
 - 1 - auxiliary input connection.
- Power output 35 watts with 2% total harmonic distortion at 1000 c.p.s., and 5% over range of 45 to 12,000 c.p.s.
Frequency response ± 1 D. B. from 20, to 20,000 c.p.s.
Input impedance 22,000 to 240,000 ohms, with source impedance of 30/50, 120/200 ohms. Gain (+) 115 D. B.
Load impedance 4, 8, 16, and 70 volts.
Tube complement (3) 12Ax7, (1) 6CG7, (2) 7027, (1) GZ34/5AR4.
Finish green enamel; weight 22 pounds.
Provide Altec-Lansing Corp. Model 342B with #4722 plug-in transformer, and Cannon Co. #XLR-3-12 straight cord plug.

- (3) LINE TRANSFORMER:
For each ceiling and wall loudspeaker location, provide and mount in corner of enclosure, one 70.7 volt impedance matching transformer with taps - for 8, 16, or 32 watts audio output constant within 1 D. B. over range of 30 to 15,000 c.p.s. Provide Cinch-Jones Company plug attached to appropriate terminal and plugged into existing audio receptacle. Provide connection to adjacent loudspeaker.

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At each floor outlet install transformer in speaker baffle enclosure, or provide transformer to Small Display Builder, for his use in connecting to loudspeakers built into his displays. Do not exceed 0.5 D. B. maximum insertion loss. or 5.0 lbs weight. Approximate size 3-13/16" x 3-3/16" x 3-3/16". Use grain-oriented steel and impregnate core and coils to resist moisture deterioration. Adjust "turns-ratio" to ensure compensation for insertion loss.
Provide Altec-Lansing Corp. Model No. 15066.

(4) COMBINING NETWORKS:

Where several separate sound tracks feed separate amplifiers and isolated speakers, and in addition are blended into the amplifier feed to one bank of speakers, provide custom assembled isolating transformer-capacitor-resistance networks to prevent cross-talk reflections.

(5) TERMINAL BLOCKS:

On each plywood terminal board mount blocks sufficient to provide one screw for every incoming conductor, every outgoing conductor, and every jumper conductor. Objective is to have every connection by screw terminals, with not more than one conductor under each screw. Provide 10% spare terminals for future connection.

Use 3/8" barrier type terminal strips with 20 points per molded strip, #6-32x1/4" brass binderhead screws, nickel plated; Cinch-Jones Company #20-141.

(6) WIRE AND CABLE:

Furnishing and connecting cables from terminal boards to loudspeakers, and microphones, is part of the work in another contract. Provide cables from terminal blocks to the sound room racks in this contract, however. Provide cable and connections from relay racks, output racks, playback machines, amplifiers, and between racks as may be required for complete operating interconnections. Bundle conductors exposed to view and wrap with spiral-plastic bindings.

A- For Audio circuits of high level (ie. loudspeakers) use twisted pair non-shielded stranded, tinned copper conductors, #16 AWG, with PVC insulation, colored black and white. 0.195" nominal diam., Eelden Co. Cat. No. 8470.

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B- For low level audio circuits from playback machines and microphones use shielded twisted pair solid copper #22 A.W.G. conductors, vinyl plastic insulation, tinned copper shield, PVC Jacket 0.156" diameter; Belden Co. #8739.

C- For D-C relay control circuits use single conductor #16 stranded copper conductor with PVC or TW color-coded jacket insulation. Establish a consistent color code for each function controlled. Tag each end of every conductor whose ends are not both seen from one point of view.

(7) LOUDSPEAKERS:

For each location shown on drawings provide an appropriate loudspeaker complying with following details:

A- Cone type permanent-magnet speakers:
Cone diameter, minimum efficiency measured on axis, free air resonant frequency, and continuous power rating, are tabulated below. Provide edge-wound aluminum ribbed voice coil sealed against dirt and magnetic dusts, with frequency response uniform within 1 decibel over range tabulated. Produce wide angle of response pattern at all frequencies by means of selected compliance for central portion of cone and different compliance for outer portion of cone, obtained through treatment with a permanent damping material. Provide dust-proof housing around alnico V and indox V magnets. Provide Altec-Lansing Corp. Loudspeaker using "Biflex cone" principle, of Cat. Numbers listed below:

Cat. No.	Power Watts	Freq. c.p.s.	Resonance	Impedance ohms	Diam. Voice Coil	Magnet Mtg hole		
						Wt.	Diam.	Wt.
415B	25	30-14,000	45	8	3"	2.4	13 1/4"	25
412B	20	40-15,000	50	8	3"	1.8	10 1/4"	15
755C	15	40-15,000	52	8	2"	0.67	7"	3.75

NOTE: Cone type speakers installed within or adjacent to animatronic figures and identified as "Jensen Speakers" are furnished and connected under another contract.

B- LOUDSPEAKER ASSEMBLY SYSTEMS:

Provide theatrical type cabinet assemblies containing combination low-frequency bass reflex and exponential horn, with top mounted sectoral high frequency horn. Mount a heavy duty low frequency driver within the front-loaded exponential horn and rear loaded bass reflex baffle. Use heavy wood construction, rigidly braced, with fiberglass padding in acoustically damped zones. Provide proper phasing at all audio frequencies.

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Assemble to emit 35 to 800 cycles from a 15" diameter high compliance low frequency transducer. Dimensions are: 42" height x 30" width x 24" depth.

For frequencies above 800 cycles use a h. f. compression type driver coupled to a straight cast aluminum sectoral horn. Divide frequencies by a full section 800 cycle network, which passes 800 to 22,000 cycles uniformly and smoothly. High frequency unit adds 10-1/4" to height of assembly. Total weight is 135 pounds; finish is gray. Audio efficiency not less than 57.0 decibels is required. Terminal impedance is 16 ohms; audio power output continuous rating is 30 watts. Provide horizontal distribution of 90°; Vertical, distribution of 40°. Provide 10 feet long jacketed and shielded twisted pair cable and Cinch-Jones Co. plug for ready connection to audio system jack.

Provide Altec-Lansing Corp. Model A7 loudspeaker system using Model 804A h.f. driver, 811B sectoral horn, 803 B LF transducer; use N800-D 800 cycle dividing network.

COMPRESSION DRIVER & TRUMPET HORN SPEAKERS:

In corridors, and exhibit areas such as tunnels, not equipped with sound effect speakers, provide paging speakers with wide area 120° x 60° dispersion, and high voice intelligibility characteristics. Die-cast body, swivel O. B. mounting. Full range 350-13,000 c.p.s., 7.5 watts; weight 4 pounds. 4, 8, 45 ohms impedance; 6-1/4" high (x) 9 1/2" wide (x) 8 1/2" deep, provide University Co. Model CML-A Horn Speaker.

(8) MICROPHONES:

Provide two microphones at each of 4 stations with one microphone labeled "Ride Areas" and the second labeled "Exhibit Areas."

- Stations are -
1. General Manager's Office.
 2. East Track Console
 3. West Track Console
 4. Sound Room - Exhibit Building

Mount microphones on desk stand with squeeze-to-talk silencing switch.

Provide microphones with cardioid pattern P. A. response, wind blast filter, shielded diaphragm, 150 ohm and high impedance taps. Response 40 to 15,000 c.p.s. Size 7-3/16" x 1-7/8" diameter. Cast body, chrome finish. 18' long shielded cord and cap. Electrovoice Co. Model #664 Microphone & Model #428 stand.

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(9) REPRODUCERS:

Provide magnetic tape playback machines with modifications described, mounted in racks, with relay-control connections, audio output connections, and 120 volt plug-in connections, to adjacent wireways. Locate to ensure adequate natural ventilation, and to minimize vibration effects.

A- 14-channel reproducer, 3-3/4, 7-1/2 inches per sec. tape speeds, 115 volts, 60 cycles, 275 watts, 10-1/2 diam. reels, 1" wide; 0.050" track width, 2-1/2 minute rewind, size 16-1/2" x 26-1/2" x 13-1/4" and 105 pounds weight. MIL R-4158B finish. Solid state electronics, response 300 to 7,500 cycles per sec.

0.1% RMS flutter. Precision-Instrument Company Model PS-214A. 1011 Commercial Street, San Carlos, California.

B- Six-cartridge repeating-reel playback reproducer console, size 12" x 12" x 12", with plug-in stacked cartridges. 3-3/4" sec. tape speed, 115 volts, 60 cycles, 375 watts, 1400 foot tape loop, remote control operation, low level input 50/2000 ohms, output 600 ohms, (+) 10 D.B.M. Response 50 to 10,000 cps with 50 DB signal-to-noise ratio. Solid state electronics. KRS Electronics Company, 4035 Transport Street, Palo Alto, California Cat. No. KRS-STACT-6.

C- Three-channel stereo magnetic tape reproducer size 19" x 24-1/2" x 8-3/4", weight 79 pounds, tape speeds 3-3/4", 7-1/2" per. sec.

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14" x 1/2" reels, 0.2% flutter, response 50 to 7500 c.p.s. for
± 1-1/2 D. B remote control. Solid-state electronics,
amplifier output (+) 18 DBM, 600 ohm line. Distortion 0.5%.
24 volt D-C controls. Scully recording Instruments Corp.,
480 Bunnell St., Bridgeport, Conn., Model No. 270.

(10) WIREWAYS:

Provide 4" square hinged-cover steel wireway attached to existing
frame racks, or to existing wall, at approximately (+) 8 feet,
with elbows, for placement of wires and cables.

G. E. Co. Type DANW, Hoffman Co. Type 4472.

(11) BAFFLES:

(A) Provide wood speaker enclosures for the surface and floor
mounted speakers. Enclosures should be unfinished ready to
be painted, with fiberglacs acoustic lining, scuff-resistant
pyroxylin fabric, tweeter port cover, hardware and speaker
reducing ring, of the following sizes:

(a) 23" wide x 30" high x 15" deep for the 12" and 15"
speakers. Use "Argos Products Company" Cat. # DBR-2A.

(b) 19-1/4" wide x 23-3/8" high x 13-1/3" deep for the 7"
speakers. Use Argos Products Company" Cat. #AD-1.

(B) Provide satin-aluminum finish wall type baffles, for the
recessed, wall, or high (22' or more) ceiling, mounted speakers.
Use Lowell Manufacturing Co. Cat. #RS12-A for the 12" speakers
and Cat. #RS7-A for the 7" speakers.

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(C) Provide low ceiling-type baffles for the recessed metal enclosure mounted speakers, in the low ceiling areas (16' above finished floor or less).

Satin finish aluminum, controlled 360° dispersion of sound. Metallic resonance prevention with rubber grommets. Complete with hardware.

Use Lowell Manufacturing Co. Cat. No. STL-7 for 7" speakers and No. STL-12 for 12" speakers.

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5.06 SUBSTITUTIONS:

In the foregoing paragraphs, the descriptions, the manufacturers names, and the catalog numbers shown, are intended to establish a high standard of quality and of reliability appropriate for this project. The Contractor is therefore, requested to submit a valid base bid which will cover the use of all major components as named and described in the specifications. △

In recognition that other makes and models of equipment are available which may be equal or superior in the fundamental characteristics to those named, the bidder is invited and urged to draw from his extensive experience, and to submit one or more alternate bids (in addition to the base bid) based on high quality substitute components. It is understood that established distributorships and trade channels may permit an individual contractor to offer one product-line preferentially over another.

Alternate bids submitted with complete and detailed technical data which will permit rapid engineering analysis, will be carefully scrutinized and seriously evaluated by the Owners' Consultants prior to an award being made. Include installed "Unit Prices" for substitute items in alternate bid.

END OF SPECIFICATION

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