

2-2-2 Basic Plan

(1) Facility Plan

Construction or renovation of studio facilities, in which equipment will be installed, is the responsibility of the Ethiopian side.

The status and work to be undertaken at each studio are as follows:

1) Sites where studio facilities have been prepared:

(a) Radio recording studios:

- EMA Radio Studio
- Gambella Radio Studio

No renovation work is needed, as the equipment will be installed in the existing recording studios.

(b) TV production studio:

- EMA TV Studio

The existing TV studio requires only minor work, which basically consists of the removal of free partitions that are dividing the master control room in order to create more space for installing the new equipment.

2) Sites where existing buildings need to be converted into studios:

(a) Radio recording studios:

- Addis Ababa Radio Studio
- Harar Radio Studio
- Mizan Teferi Radio Studio

Existing ordinary buildings will be converted into studios and sub-control rooms, for which installation of partition walls, observation windows between studios and sub control rooms, interior of walls and ceilings, and sealing of windows will be needed. Renovation work with new construction materials should secure certain sound-absorption and acoustic characteristics.

(b) TV production studio

- Mekelle TV Studio

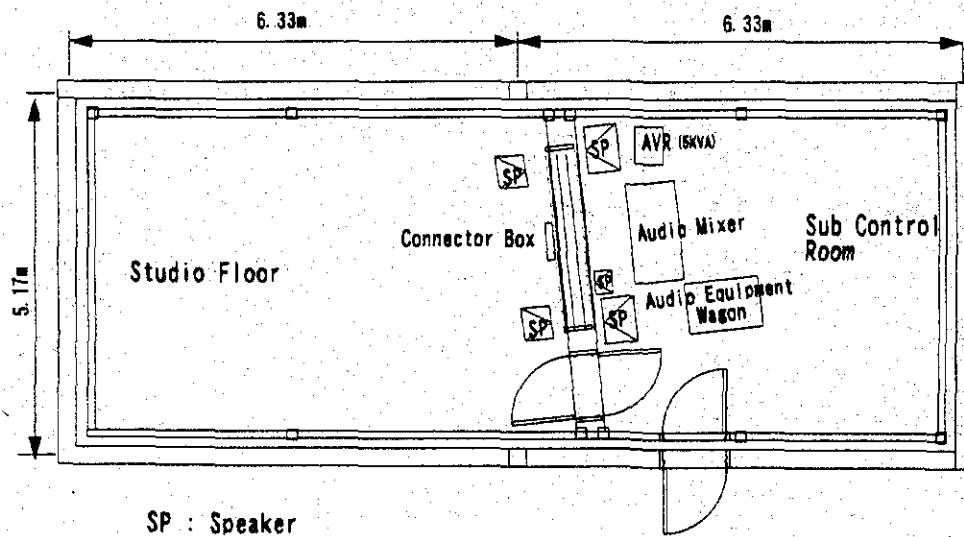
As basic TV production equipment will be installed for TV program production using studio floor in common with the existing radio floor, the renovation work will require only providing through-holes on existing walls for wiring electric cables.

3) Sites where studio building have yet to be constructed:

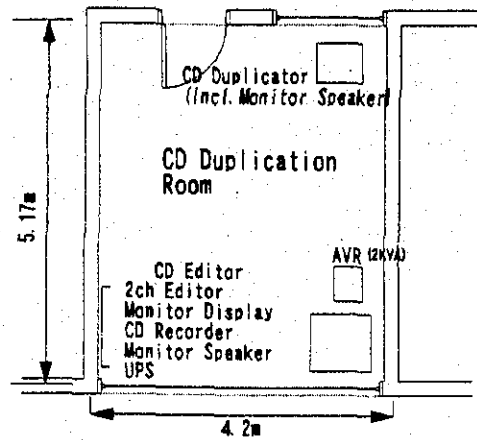
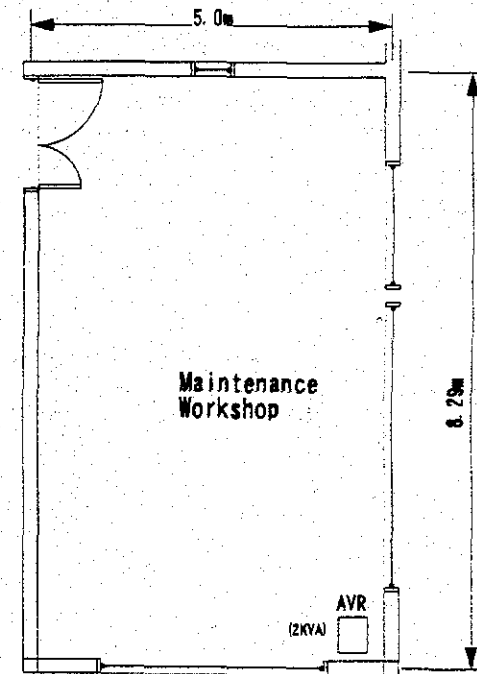
Radio recording studios:

- Alemaya Radio Studio
- Dire Dawa Radio Studio
- Semera Radio Studio

For these sites, EMA-standard recording studios need to be constructed. (Refer to Fig. 2-2-1 Floor Layout of EMA-Standard Radio Recording Studio.)



SP : Speaker



Key Plan

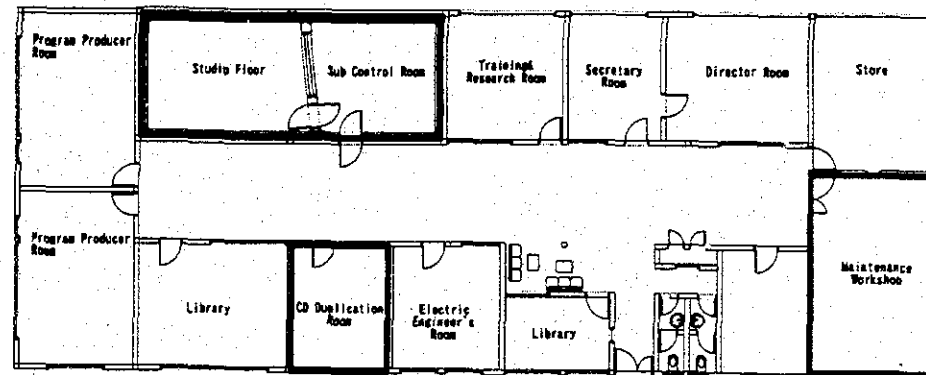


Fig 2-2-1 Floor Layout of EMA-Standard Radio Recording Studio

(2) Equipment Plan

Based on the site survey and examinations in Japan after the survey, the contents of the request submitted by the Ethiopian government were reviewed and the items of equipment for this project were selected

1) Criteria for Equipment Selection

(a) Appropriateness for Activities Planned

Equipment shall be minimum scale and suitable to be able to produce planned number and contents of programs.

(b) Appropriateness for Technical Capabilities

Grade of equipment shall be appropriate for the skill levels of EMA staff and the personnel of Regional Education Bureaus who are to be trained by EMA staff.

(c) Operation and Maintenance

Equipment for which spare parts are locally obtainable shall be selected.

(d) Conformity with the Principles of Basic Design Study

In principle, equipment items that are agreed upon on the Minutes of Discussion at Basic Design Study shall be selected.

2) Basic Approach to System Design

(a) Standardization of Equipment to be Procured

Equipment to be used at EMA and Regional Education Bureaus shall be of same or compatible types as much as possible.

- As EMA engineers will train and instruct the engineers of the Regional Education Bureaus with regard to the operation, maintenance, and repair of the equipment, it will be more efficient that equipment for the studios of EMA and Regional Education Bureaus will be of the same type.
- By standardizing the equipment, spare parts will be limited to a smaller number in kinds and therefore obtained easily and shared among the studios.

(b) Spare Parts

a) Guidelines for spare parts

- Local staff should be able to replace spare parts easily.

- Spare parts should include mainly circuit boards, modules and spare units of major items of equipment to ensure smooth operation for at least one year after the handover of equipment.

b) **Scope of spare parts**

Spare parts to be procured along with the equipment shall consist of circuit boards, modules, units, mechanical and small parts, lamps, and fuses.

- **Circuit boards, modules and spare units:**
Shall have specific electrical properties and be easy to mount and dismount. (Broken ones will be replaced, repaired, and reused.)
- **Mechanical and small parts:**
Consist of relays, select switches, magnetic heads, rotating parts, faders, volume controls, and other such parts whose performance deteriorates due to mechanical wear and tear.
- **Lamps, fuses, etc:**
Need to be replaced as they blow up from time to time.

3) **Radio Recording Studio Equipment**

Equipment needed for radio program production consists of the following:

(a) **Radio Recording Studio**

It is used for the production of various educational programs. Depending on the program contents, 5 to 10 students will join.

Program production equipment items used for the recording studio comprise 5 microphones, an announcer cough controller including 2 cough boxes, 2 CD players, 1 CD recorder, 1 cassette tape recorder, 2 audio effect instruments, and a 16-input audio mixer.

As the CD equipment and the audio mixer operate digitally, even repeated recording will not cause deterioration in sound quality.

(b) **CD Duplication System**

Currently, each produced program which is duplicated on tapes is played alternately on two open reel tape recorders and broadcasted in succession from

transmission studios in the transmitting is changed stations. This method will continue even after the recording medium in changed to CD. Thus, CD duplicator will be needed to make copies of the programs to be distributed to transmitting stations.

The number of CD recorders for the duplicator required at each studio is as follows:

[EMA]

Programs produced for secondary schools at EMA are broadcasted nationwide from eleven transmitting stations.

- No. of programs broadcasted annually: 444
 - No. of CDs needed: 111 (one CD holds four programs, $444 \div 4 = 111$)
(IRI programs are recorded on cassette tapes and distributed to elementary schools.)
 - No. of copies for broadcasting: $111 \times 11 \text{ stations} \times 2$ (1 for broadcast use, 1 for spare) = 2,442
 - Copies for Regional Education Bureaus (secondary school programs):
 $120 \text{ programs} \div 4 \times 11 \text{ Regional Education Bureaus} = 330$
-
- Total copies: 2,772/year
- Time needed for duplication: about 3 hours (30 min. for preparation, 70 min. for duplication, 70 min. for checking)

To make 2,772 copies each year by running a duplicator twice a day,

$$2,772 \text{ copies} \div 500 \text{ times (250 days/year} \times 2 \text{ times/day)} \approx 6$$

Six (6) CD recorders will be needed.

[Regional Education Bureaus]

Programs produced at the Regional Education Bureaus are broadcasted from their respective transmitting stations. Below is the number of CD recorders needed for each Regional Education Bureau estimated by the least number of programs.

- No. of programs broadcasted annually: 240 (average)
- No. of CDs needed: 60 ($240 \div 4 = 60$, one CD holds four programs.)
- No. of copies for broadcasting: 60×2 (1 for broadcast use, 1 for spare) = 120

One CD recorder would be sufficient to make 120 copies each year by running a duplicating machine.

(c) CD Editing System

To produce a program, editing of recorded materials is necessary. Through the editing process, what will be removed and what will be kept are decided. One CD editing machine is essential for production.

As CD editing machines handle digital signals, deterioration of sound quality will not occur after repeated editing.

(d) Maintenance Equipment

Periodic maintenance is important for keeping the program production equipment in good condition. For this reason, measuring instruments that can accurately assess the condition of equipment will be needed.

Thus, audio test signal oscillator, oscilloscopes, digital multi meter, and other minimum instruments and tools necessary for basic maintenance work shall be procured.

(e) Power Supply Equipment

a) Uninterrupted Power Supply System (UPS)

As these studios are used for recording but not for live broadcasting, they will not be seriously affected by power outage. Thus, UPS will not be procured.

However, small UPS will be attached to individual equipment that stores data, such as the CD editing machine with a built-in computer, to prevent the loss of memory by power outage.

b) Automatic Voltage Regulator (AVR)

Electric power supply in Ethiopia is not stable. Equipment breakage occurs frequently due to fluctuation of voltage. Therefore, AVR must be installed on the production equipment.

Instead of installing a single large-capacity AVR supplying main power to all equipment, a small-capacity AVR will be installed in each room according to its load for the following reasons:

- If there is only one AVR at power source, the entire electrical system can go down when the AVR is damaged by overload or short circuit.
- If AVRs are distributed to each room in the studio building, broken one can be temporarily replaced with another unit in other room, though it may limit the operation of certain equipment.
- Smaller AVRs are lighter and easier to transport and install.

c) Power Generator

Power generators will not be procured for the same reason as UPS.

(f) Transmission Studio Equipment

Each of the eleven transmitting stations has three transmission studios, of which only two are presently operating. Transmission studios broadcast programs by running tape recorders, which need to be replaced with CD players, as the recording medium will be changed from tape to CD. Since two CD players will be needed for each transmission studio for continuous broadcasting, a total of four CD players will be procured for each transmitting station.

(g) Compact Disc

As the recording medium will be switched to CD, a sufficient number of CDs to cover the production requirements for the initial period (six months) need to be in place.

CDs will be used for recording materials, editing, broadcasting, duplicating, and storing for archival purposes. Required number of CDs varies depending on how they will be used.

EMA produces 444 programs per year (about 37 per month), while Regional Education Bureaus make varying numbers of programs, but on the average 325 per year (27 per month).

- Production of one program requires five CDs (3 for recording materials and 2 for editing), which are erased and reused bimonthly.
- Each CD for broadcasting can record four programs (15 minutes each).

No. of CDs to be used at EMA (for 6 months):

- For broadcasting: $2 (1 \text{ for broadcast and } 1 \text{ for spare}) \times 222 \text{ programs}$
(for 6 months) $\div 4 \times 11 \text{ stations} = 1,221$
- For library: $1 \times 222 \text{ programs} \div 4 = 55$
- For production: $5 \times 222 \text{ programs} \div 2 \text{ (erased bimonthly)} = 555$

A total of about 1,850 CDs will be needed at EMA.

No. of CDs to be used at each Regional Education Bureau (for 6 months):

- For broadcasting: $2 (1 \text{ for broadcast and } 1 \text{ for spare}) \times 163 \text{ programs}$
(for 6 months) $\div 4$
 $\times 2.5 \text{ (average) stations} \approx 200$
- For library: $1 \times 163 \text{ programs} \div 4 = 41$
- For production: $5 \times 163 \text{ programs} \div 2 \text{ (erased bimonthly)} = 408$

A total of about 650 CDs will be needed.

(h) Portable Cassette Tape Recorder

During the site survey, the recording of an elementary school program outside the studio happened to be observed. As some recording sessions take place outside the studio, outdoor recording equipment will be needed. Although such items were not included in the request, it is assumed that two portable cassette tape recorders (one for actual use and one for spare) will be necessary for each Regional Education Bureau.

4) TV Production Studio Equipment

[EMA TV Studio]

(a) TV Studio

Equipment necessary for TV program production consists of the following:

a) Video equipment

- Color camera system

A 2/3-inch type CCD is more preferable than a 1/2-inch type for studio TV cameras, because color cameras with 2/3-inch CCDs have a higher resolution, which is important to show the exact colors and precise movements in experiments and observations in the biology,

chemistry, and physics programs.

Three cameras, the same number as the existing cameras, shall be procured. They will be of a professional type operated with remote control panels to allow the video engineers to adjust the cameras on the control table for easy operation.

- **Video switcher**

A professional type 8-input (3 for cameras, 4 for VTRs and one for character generator) digital switcher shall be procured.

- **VTR**

Two (2) professional type video tape players and two (2) professional type video tape recorder/players shall be procured for program production.

As the video switcher and VTRs are processed with digital signals, the video quality will not deteriorate after repeated replay and recording.

- **Picture monitor**

Color picture monitors of professional types shall be procured.

The number of picture monitors is as follows:

- **14-inch color picture monitor: 13 sets**

- VTR : 3 sets
- Studio Camera : 3 sets
- Character Generator: 2 sets
- External Input : 2 sets
- Video Engineer : 1set
- Lighting Operator : 1 set
- Audio Mixer : 1set

- **20-inch color picture monitor: 2 sets**

- Video Switcher (Preview) : 1 set
- Video Switcher (Program Out) : 1 set

- 29-inch color picture monitor: 2 sets
 - Studio Floor : 2 sets
- 9-inch color picture monitor: 3 sets
 - VTR : 3 sets (Rack mounted type)

- **Lighting equipment**

Power capacity for lighting equipment of a typical studio is calculated at $0.6\text{kVA}/\text{m}^2$. As the effective studio floor area is considered about 80% of the total floor area of 103m^2 , the studio's power capacity is calculated to 49kVA ($=103 \times 0.8 \times 0.6$). However, the actual power requirement for lighting is likely to be smaller, as the production of educational programs usually uses simpler studio sets.

The Ethiopian side requested a dimmer with scene memory function that can store dimmer actions for several tens separate scenes and reproduce them with a single touch on a control panel, as well as a circuit control device that can be combined freely with a fader and dimmer unit and play memory. However, such specifications would be beyond what is required of for producing educational programs in a small studio.

The existing dimmer apparatus has 18 faders (18 circuits), 2-scene preset function, and a dimmer capacity of 36kVA . Loading receptacles and faders are directly connected.

In the studio floor, grid pipes for hanging lights are installed beneath the ceiling, to which 18 double-receptacle outlets are fixed. The outlets are evenly distributed over the floor area of $11\text{m} \times 9.4\text{m}$ ($=103\text{m}^2$). In addition, pipes are spaced at intervals of two meters, which does not allow easy setting of lighting fixtures.

To enable the new video equipment to function and perform fully, the lighting equipment needs to be upgraded in terms of increase of dimmer capacity and ease of operation. Thus, the new equipment will be of a 24-fader (24-circuits), 3-scene preset, and 48-kVA dimmer capacity type.

As is the case with the existing equipment, loading receptacle outlets

and faders will be connected directly. As it is not convenient to hang lights directly on the grid provided at four meters above the floor, pantograph-type suspensions shall be procured.

b) Audio equipment

- Audio mixer

The same audio mixer as that to be installed in the radio studio shall be procured for the purpose of sharing spare parts.

The number of the audio mixer inputs will be 16 for ten microphones, three VTRs, one CD recorder, one CD player and one cassette tape recorder.

A graphic equalizer and a multi-effector shall be procured for the sound effect.

(b) Portable Video Recording System

Two professional type VTR-integrated portable cameras shall be procured for outdoor shooting. Sound will be recorded with a wireless microphone built in the camera. A battery light will be attached to the camera for shooting indoor or at night.

The videotape recording format of the camera will be the same as that of the VTR equipment to be installed in the studio.

(c) Master Control Room

At the master control room, programs recorded on tapes are replayed and transmitted, and the video/audio quality and the broadcast signal of programs being aired are monitored.

Equipment needed for this room includes an audio/video matrix switcher, 2 VTRs for playing programs, picture monitors for supervising programs, a waveform monitor for checking the video quality, and a vector scope.

Educational TV programs are broadcasted nationwide from Monday through Friday for three hours a day via the terrestrial network of ETV and satellite on rental basis.

Programs are sent from EMA to ETV through a microwave link (STL).

Presently, there is only one STL each for receiving and sending without spares.

Thus, when the STL breaks, secondary school programs are suspended until it

is repaired.

An STL system with a dual configuration – one in use; the other for standby – that can instantly changeover just in case of breakage, shall be procured to ensure uninterrupted broadcasting.

(d) Video Tape Editing Room

For the editing room, the following types of video editing systems for various applications shall be procured. VTR will be of the same model as that of the studio.

The Ethiopian side requested four sets of editing systems (one A/B-roll, two tape-to-tape, and one non-linear types). However, considering the fact that the studio will be producing 120 programs in one year and that one editing system can handle five programs per month spending five days for editing one program, two sets of editing systems will be sufficient for producing ten programs each month.

Therefore, a total of two sets (one A/B-roll and one non-linear) will be appropriate.

a) A/B-Roll Editing System

By switching video or mixing audio signals on two VTRs, this device can edit tapes into a highly refined program in one editing session. It can also be used for retouching the finished program.

b) Non-Linear Editing System

It imports digital signals recorded on VTR into its memory (usually a hard disc) and processes the signals with a built-in computer for editing. It requires relatively short access time and allows detailed editing. Digital signals edited on the hard disc are recorded on VTR to complete the editing work. Repeated editing will not cause deterioration of video or audio quality.

(e) VHS Video Tape Duplication System

Generally, educational TV programs are produced to supplement classroom lectures in secondary schools. However, English programs will be recorded on videotapes to be used in every school.

The videotape duplicating system will be comprised of a videotape player and four VHS videotape recorders.

(f) Video Tape Logging System

Recorded scenes need to be reviewed to check the contents and unwanted parts and to calculate the time of sections that can be used in a program before editing. Also, producers use the preview system to check the final version after editing.

(g) Power Supply Equipment

Based on the same principles for the radio studios, small-sized UPSs and AVRs will be procured.

a) Uninterrupted Power Supply System (UPS)

Although UPS will not be installed in the electrical system, mini-sized UPS will be attached to the non-linear editing machine and other equipment that have built-in computers to protect stored data in case of power outage or instantaneous interruption.

b) Automatic Voltage Regulator (AVR)

According to the load capacity of the equipment, a 30-kVA AVR will be procured. For the VHS videotape duplicating machine that will be installed in a separate building (Audio Visual Section) from the TV studio, a 2-kVA AVR shall be procured.

c) Power Generator

Since the EMA Head Office recently installed and began operating a power generator (50kVA), it is not necessary to procure new power generator.

(h) Equipment for Maintenance Workshop

As with the radio equipment, minimum instruments needed for periodic maintenance and servicing, such as video generator, oscilloscope, waveform monitor, vector scope and digital multi tester, as well as a set of simple tools, shall be procured.

(i) Video Tape

VTRs to be procured under this project will adopt a different recording format from that of the existing VTR equipment. As is the case with CDs, an enough number of videotapes to cover the production activities for at least six months need to be procured. The studio plans to produce 60 programs in six months. Assuming that at least six tapes (3 for shooting materials and 1 each for editing, recording, and broadcasting) will be used to make one program, and tapes for material shooting and editing will be erased and reused every other month, the studio will initially need the following number of tapes:

$$4 \text{ tapes (3 for material shooting and 1 for editing)} \times 60 \text{ programs} \div 2 \\ = 120 \text{ tapes}$$

$$2 \text{ tapes (1 each for recording and broadcasting)} \times 60 \text{ programs} \\ = 120 \text{ tapes}$$

A total of 240 videotapes will be required.

VHS tapes will be excluded from this project, as they are regularly available in stores in Addis Ababa.

[Mekelle TV Studio]

Since there is no prospect of constructing the TV studio building, minimum TV production equipment to be used in the existing radio studio shall be procured.

(a) Portable Video Recording System

Two portable VTR cameras with wireless microphones (1 for actual use and 1 for spare) of the same model as that to be procured for EMA will be procured. The portable cameras will enable shooting in the radio studio or on location (schools, etc).

(b) Non-Linear Editing System

Scenes shot with cameras are edited with an editing machine to make a complete program. While a tape-to-tape and a non-linear editing system are both possible choices, the latter will be chosen, as it has the technical capability to do more effective editing. Because it handles digital signals, repeated editing will not cause deterioration of video or audio quality.

(c) VHS Videotape Duplication

In order to distribute the educational programs produced on VHS videotapes, a VHS duplicating machine shall be procured.

(d) Video Tape Logging System

Scenes shot with the portable camera will be reviewed on a preview system to check the contents before editing.

(e) Power Supply Equipment

Although a power generator and UPS will not be installed in the electrical system, a mini-type UPS will be attached to the non-linear editing machine.

Two 2-kVA AVR's shall be procured. One will be placed for the cameras in the studio floor and the other placed in the editing room (currently tape storage room) for the editing, duplicating and preview equipment.

(f) Equipment for Maintenance Workshop

Two sets of repair tools shall be procured.

(g) Videotapes

Mekelle TV Studio plans to produce 20 programs per year. Assuming that at least three videotapes (2 for shooting materials and 1 for editing) will be used to make one program, the studio will need the following number of videotapes for a 1-year period:

$$3 \text{ tapes} \times 20 \text{ programs} = 60 \text{ tapes}$$

(3) Composition of Equipment

As the result of the examination and evaluation of the design policies and conditions, the compositions of the main equipment to be procured for EMA Radio Studio, Regional Education Bureau Radio Studios (Gambella, Harar, Semera, Addis Ababa, Mizan Teferi, Dire Dawa, Alemaya), EMA TV Studio and Mekelle TV Studio are as follows;

1) EMA Radio Recording Studio Equipment

Equipment	Quantity	Remarks
(a) Radio Recording Studio		
• Microphone	5 sets	2 Condenser Type, 3 Dynamic Type
• Audio Mixer	1 set	16-Input Digital Stereo Mixer, Professional Type
• CD Player	2 sets	Professional Type
• CD Recorder	1 set	Professional Type
• Compact disc	1850 pcs	CD-RW
• Cassette Tape Recorder	1 set	Professional Type
• Audio Monitor for Sub-Control Room	1 pair	Incl. Amplifier and Stand
• Studio Speaker	1 pair	Incl. Amplifier and Fitting Material
• Backtalk Speaker	1 set	
• Announcer Cough Controller	1 set	Incl. 2 Cough Boxes
• Operation Desk	1 set	Mixer Table
• Audio Equipment Wagon	1 set	
• Audio Effector Instrument	2 sets	1 Multi Effector, 1 Graphic Equalizer
• Audio Distribution Amplifier	2 sets	analog
• Word Sync. Generator (44.1kHz)	1 set	Incl. distribution amplifier
• Audio Patch Panel	1 set	
• Recording Lamp	2 sets	Incl. Control Unit
• Headphone	4 sets	2 Studio Floor, 2 Sub-Control Room
• Chair	2 sets	for mixing engineer and producer
(b) CD Duplication Room		
• CD Recorder (1 Master, 6 Slaves)	1 set	Incl. Recording Control System
• Audio Monitor Speaker for Rack	1 set	2ch Amp., Speaker built-in type
• Audio Selector	1 set	12 × 1 (Stereo Type)
• System Rack	1 set	
• Chair	1 set	
(c) CD Editing Room		
• Digital Audio Editing System	1 set	Hard Disc or MO Disc Type
• CD Recorder	1 set	Professional Type
• Monitor Display	1 set	for Editing
• Audio Monitor	2 sets	with Amplifier
• Headphone	1 set	
• UPS (0.5kVA)	1 set	Single Phase 220V 50Hz
• Operation Desk	1 set	
• Chair	1 set	
(d) Maintenance Equipment		
• Digital Multi Meter	1 set	
• Oscilloscope	1 set	
• Audio Test Signal Oscillator	1 set	
• Tool Kit	2 sets	
• CD Recorder	2 sets	
• CD Player	2 sets	
(e) Power Supply Equipment		
• AVR (10kVA)	1 set	for Radio Studio, Editing Room, Duplication Room, Single Phase 220V 50Hz
(f) Transmission Studio Equipment		
• CD Player for 11 Transmitting Stations	4 sets each	2 Transmission Studios respectively Professional Type
(g) Spare Parts/Unit	1 set	
(h) Installation Materials	1 set	

2) Regional Education Bureau Radio Recording Studio Equipment (Gambella, Harar, Semera, Addis Ababa, Mizan Teferi, Dire Dawa, Alemaya)

Equipment	Quantity	Remarks
(a) Radio Recording Studio		
• Microphone	5 sets	2 Condenser Type, 3 Dynamic Type
• Audio Mixer	1 set	16-Input Digital Stereo Mixer, Professional Type
• CD Player	2 sets	Professional Type
• CD Recorder	1 set	Professional Type
• Compact disc	650 pcs	CD-RW
• Cassette Tape Recorder	1 set	Professional Type
• Audio Monitor for Sub-Control Room	1 pair	Incl. Amplifier and Stand
• Studio Speaker	1 pair	Incl. Amplifier and Fitting Material
• Backtalk Speaker	1 set	
• Announcer Cough Controller	1 set	2 Cough Box
• Operation Desk	1 set	Mixer Table
• Audio Equipment Wagon	1 set	
• Audio Effect Instrument	2 sets	1 Multi Effector, 1 Graphic Equalizer
• Audio Distribution Amplifier	2 sets	analog
• Word Sync. Generator (44.1kHz)	1 set	Incl. distribution amplifier
• Audio Patch Panel	1 set	
• Recording Lamp System	2 sets	Incl. Control Unit
• Headphone	4 sets	2 Studio Floor, 2 Sub-Control Room
• Chair	2 sets	for mixing engineer and producer
(b) CD Duplication Room		
• CD Recorder (1 Master, 1 Slave)	1 set	Incl. Recording Control System
• Audio Monitor Speaker for Rack	1 set	2ch Amp., Speaker built-in type
• Audio Selector	1 set	4 × 1 (Stereo Type)
• System Rack	1 set	
• Chair	1 set	
(c) CD Editing Room		
• Digital Audio Editing System	1 set	Hard Disc or MO Disc Type
• CD Recorder	1 set	Professional Type
• Monitor Display	1 set	for Editing
• Audio Monitor	2 sets	with Amplifier
• Headphone	1 set	
• UPS (0.5kVA)	1 set	Single Phase 220V 50Hz
• Operation Desk	1 set	
• Chair	1 set	
(d) Maintenance Equipment		
• Digital Multi Meter	1 set	
• Oscilloscope	1 set	
• Audio Test Signal Oscillator	1 set	
• Tool Kit	2 sets	
• CD Recorder	1 set	
(e) Portable Cassette Tape Recorder	2 sets	Incl. Microphone & Headphone
(f) Power Supply Equipment		
• AVR (5kVA)	1 set	for Radio Studio, Single Phase 220V 50Hz
• AVR (2kVA)	2 sets	for Editing & Maintenance rooms, Single Phase 220V 50Hz
(g) Spare Parts/Unit	1 set	
(h) Installation Materials	1 set	

3) EMA TV Recording Studio Equipment

Equipment	Quantity	Remarks
(a) TV Recording Studio		
a) Video Equipment		
• Video Switcher (PAL System)	1 set	8 Input Digital Switcher with Video Effector, Professional Type
• Color TV Studio Camera (PAL)	3 sets	2/3-inch 3CCD Camera, Professional Type
• × 18 Zoom Lens	3 sets	
• 5-inch View Finder	3 sets	
• CCU	3 sets	
• Tripod	3 sets	
• Video Tape Recorder/Player (PAL)	2 sets	Digital VTR with TBC Remote, Professional Type
• Video Tape Player (PAL)	2 sets	Digital VTR with TBC Remote, Professional Type
• Character Generator (PAL)	1 set	
• Video Generator (PAL)	1 set	Analog (Video, Audio, Sync. etc.)
• Vector Scope (PAL)	1 set	
• Waveform Monitor (PAL)	1 set	
• Time Base Corrector (PAL)	1 set	Incl. Remote Controller with Color Corrector function
• Video Distribution Amplifier (PAL)	1 set	12 Analog, 1 Digital
• Component Decoder	1 set	
• A/D Converter	1 set	
• Video Patch Board	4 sets	
• Monitor Selector	2 sets	for Camera Control & Lighting
• 20-inch Color Monitor (PAL)	2 sets	for Sub-Control Room
• 14-inch Color Monitor (PAL)	13 sets	for Sub-Control Room
• 9-inch Color Monitor (PAL)	3 sets	for Sub-Control Room
• 29-inch Color Monitor (PAL)	2 sets	For Studio Floor
• Monitor Shelf	1 set	
• System Rack	2 sets	
• System Console	1 set	
• Table for Character Generator	1 set	
• Chair	4 sets	
b) Audio Equipment		
• Audio Mixer	1 set	16-Input Digital Mixer
• Microphone	10 sets	2 Condenser Type, 4 Lavalier Type, 4 Dynamic Type
• CD Recorder	1 set	Professional Type
• CD Player	1 set	Professional Type
• Cassette Tape Recorder	1 set	Professional Type
• Monitor Speaker for Sub-Control Room	4 sets	with Amplifier
• Studio Monitor Speaker	2 sets	with Amplifier
• Audio Monitor Speaker for Rack	4 sets	2ch Amplifier, Speaker built-in type
• Monitor Speaker for Talk back	1 set	with Amplifier
• Audio Distribution Amplifier	2 sets	1 analog, 1 digital
• D/A Converter	1 set	
• Audio Effector	2 sets	1 Multi Effector, 1 Graphic Equalizer
• Word Sync. Generator (48kHz)	1 set	Incl. Distribution Amplifier
• Intercom System	1 set	
• Tally Control Unit	1 set	
• ON-AIR Lamp Control Unit	1 set	
• Headphone	2 sets	
• Audio Selector	1 set	for CD & Cassette monitor
• Audio Delay Unit	1 set	for Phase Adjustment

Equipment	Quantity	Remarks
• Audio Patch Panel	3 sets	2 analog, 1 digital
• Audio Equipment Wagon	1 set	
• System Console	1 set	
• Table for Video Monitor	1 set	
• Chair	2 sets	
c) Lighting Equipment		
• Dimmer Rack	1 set	Power Supply Capacity 48kVA, Professional Type
• Lighting Control Board	1 set	24ch × 3-scene
• Lighting Table	1 set	
• Spot Light (1kW)	8 sets	
• Spot Light (650W)	16 sets	Fresnel Lens
• Flood Light 500W × 2	12 sets	
• Horizon Light 500W	6 sets	
• Hanging Device	36 sets	Pole Hanger Type
• Socket	12 sets	for 12 Extended Circuit
• Lamp (1kW)	40 sets	
• Lamp (650W)	80 sets	
• Lamp (500W)	150 sets	
• Color Filter	90 sets	30 Red, 30 Green, 30 Blue
• Lighting Stand	4 sets	with Caster
• Clamp	36 sets	
• Chair	1 set	
(b) Portable Video Recording System		
• Portable Digital Camera Recorder (PAL)	2 sets	1/2-inch 3CCD Camera, Professional Type
• Wireless Microphone System (2 frequencies)	2 sets	UHF Band
• Battery for Camera	2 sets	with Battery Charger and 3 Batteries
• Portable Light Set	2 sets	
• Tripod	2 sets	
(c) Master Control Equipment		
• Audio/Video Matrix Switcher	1 set	10 × 10 Analog Switch with Remote Control
• Video Tape Player (PAL)	2 sets	Digital VTR, Professional Type
• Video Generator (PAL)	1 set	Analog Type (Video/Audio/Sync.)
• Video Distribution Amplifier (PAL)	3 sets	Analog Type
• Vector Scope (PAL)	1 set	
• Waveform Monitor (PAL)	1 set	
• Time Base Corrector (PAL)	1 set	Incl. Remote Controller with Color Corrector function
• Audio Delay	1 set	
• 20-inch Color Monitor (PAL)	1 set	for Preview
• 14-inch Color Monitor (PAL)	1 set	Switcher Output Monitoring
• 9-inch Color Monitor (PAL)	5 sets	Switcher Input Monitoring
• Monitor Speaker	2 sets	Switcher Output Monitor with Amplifier
• VU meter unit	1 set	
• Intercom System	1 set	between Master Control Room and Sub-Control Room
• Monitor Shelf	1 set	
• Studio-to-Transmitter Link (STL)	1 set	FPU Type (Dual Configuration) with Automatic Change-Over Switch
• TV Tuner (PAL)	1 set	
• Air Monitor Speaker	1 set	
• Video Patch Panel	1 set	
• Audio Patch Panel	1 set	
• System Rack	3 sets	

Equipment	Quantity	Remarks
• System Console	1 set	
• Chair	2 sets	
(d) Video Tape Editing Equipment		
a) A/B-Roll Editing System		
• Video Tape Player (PAL)	2 sets	Digital VTR, Professional Type
• Video Tape Recorder/Player (PAL)	1 set	Digital VTR, Professional Type
• Digital Multi Effects/Switcher System (PAL)	1 set	Professional Type
• Vector Scope (PAL)	1 set	
• Waveform Monitor (PAL)	1 set	
• TBC Remote Controller	3 sets	
• Editing Controller (PAL)	1 set	
• Audio Mixer	1 set	10-Input Analog Mixer
• Character Generator (PAL)	1 set	
• 14-inch Color Monitor (PAL)	2 sets	
• 9-inch Color Monitor (PAL)	4 sets	
• Headphone	1 set	
• Video Distribution Amplifier	1 set	for Sync. Distribution
• Audio Delay	1 set	
• Audio Monitor	2 sets	with Amplifier
• System Rack	1 set	
• Editing Table	1 set	
• Table for Character Generator	1 set	
• Chair	1 set	
b) Non-Liner Editing System		
• Non-Liner Set	1 set	Hard Disc Type
• Video Tape Recorder/Player (PAL)	1 set	Digital VTR, Professional Type
• TBC Remote Controller	1 set	
• 14-inch Color Monitor (PAL)	1 set	Professional Type
• Monitor Display	1 set	
• Audio Monitor	2 sets	with Amplifier
• UPS	1 set	Single Phase 220V, 1kVA
• Video Distribution Amplifier	1 set	for Sync. Distribution
• Headphone	1 set	
• Editing Table	1 set	
• Side Desk	1 set	
• Chair	1 set	
(e) VHS Video Tape Duplication System		
• Video Tape Player (PAL)	1 set	Digital VTR, Professional Type
• VHS Video Recorder (PAL)	4 sets	Consumer Type
• A/V Distribution Amplifier (PAL)	1 set	
• A/V Selector	1 set	6 × 1
• Audio Monitor Speaker for Rack	1 set	2ch Speaker with Amplifier (built-in type)
• 14-inch Color Monitor (PAL)	1 set	Professional Type
• System Rack	1 set	
• Chair	1 set	
(f) Video Tape Logging System		
• Video Tape Player (PAL)	2 sets	Digital VTR, Professional Type
• 14-inch Color Monitor (PAL)	2 sets	Professional Type
• Monitor Speaker	4 sets	with Amplifier
• Operation Desk	2 sets	

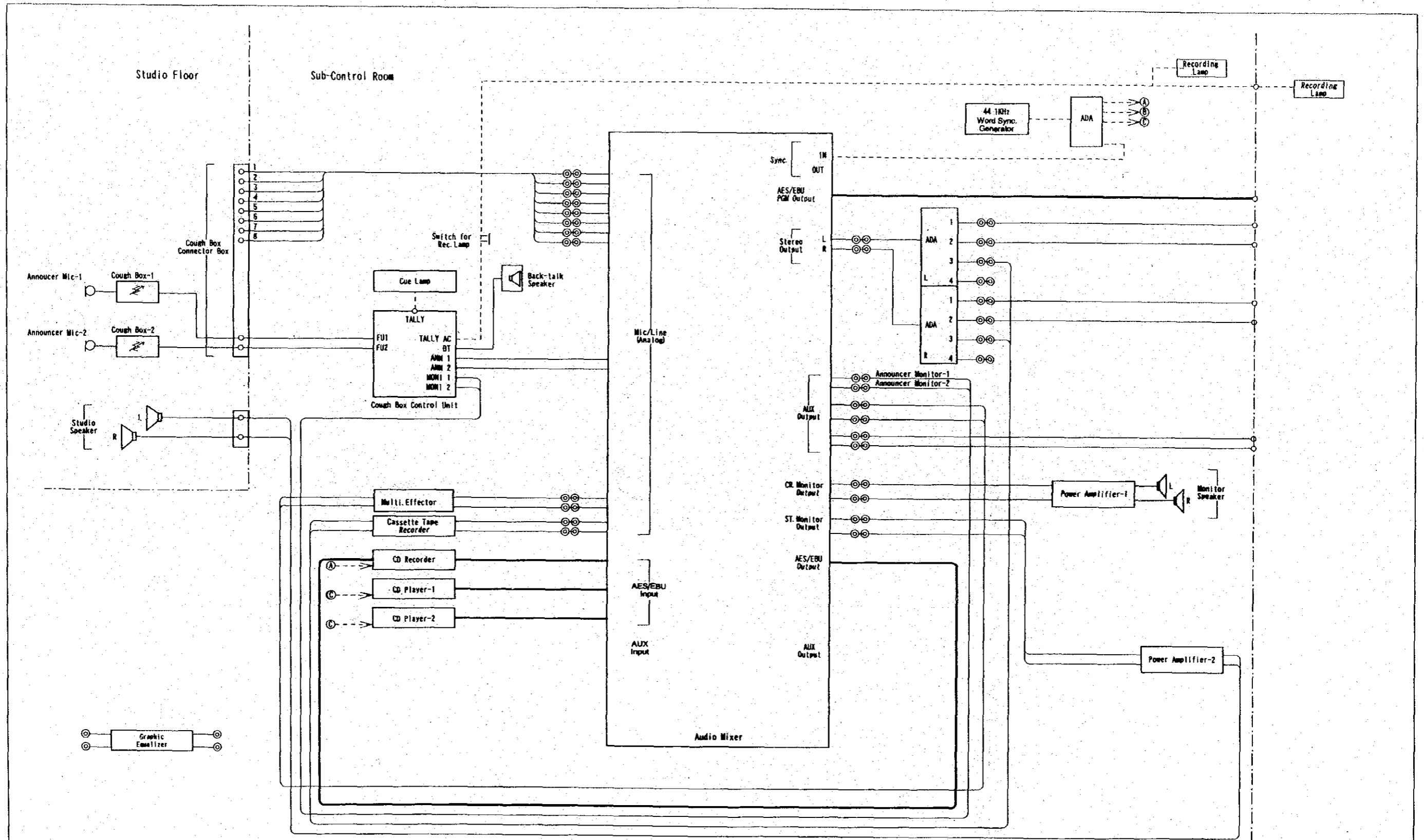
Equipment	Quantity	Remarks
• Chair	2 sets	
(g) Power Supply Equipment		
• Automatic Voltage Regulator (30kVA)	1 set	for Studio, Single Phase 220V
• Automatic Voltage Regulator (2kVA)	2 sets	for Duplication Room & Maintenance Workshop, Single Phase 220V
(h) Maintenance Equipment		
• Digital Multi Tester	1 set	
• Oscilloscope	1 set	
• Video Generator	1 set	
• Waveform/Vector Monitor	1 set	
(i) Video Tape		
• 90 Minutes Tape	40 rolls	
• 60 Minutes Tape	100 rolls	
• 30 Minutes Tape	100 rolls	
(j) Spare Parts/Unit	1 set	
(k) Installation Materials	1 set	

4) Mekelle TV Recording Studio Equipment

Equipment	Quantity	Remarks
(a) Portable Video Recording System		
• Portable Digital Camera Recorder (PAL)	2 sets	1/2-inch 3CCD Camera, Professional Type
• Wireless Microphone System 2 frequencies	2 sets	UHF Band
• Battery for Camera	2 sets	with Battery Charger
• Portable Light Set	2 sets	
• Tripod	2 sets	
(b) Non-Liner Editing System		
• Non-Liner Set	1 set	Hard Disc Type
• Video Tape Recorder/Player (PAL)	1 set	Digital VTR, Professional Type
• TBC Remote Controller	1 set	
• 14-inch Color Monitor (PAL)	1 set	Professional Type
• Monitor Display	1 set	
• Audio Monitor	2 sets	with Amplifier
• UPS	1 set	Single Phase 220V, 1kVA
• Headphone	1 set	
• Editing Table	1 set	
• Side Desk	1 set	
• Chair	1 set	
(c) VHS Video Tape Duplicator		
• Video Tape Player (PAL)	1 set	Digital VTR, Professional Type
• VHS Video Recorder (PAL)	2 sets	Consumer Type
• A/V Distribution Amplifier (PAL)	1 set	
• A/V Selector	1 set	6 × 1
• Audio Monitor Speaker for Rack	1 set	2ch Speaker with Amplifier (built-in type)
• 14-inch Color Monitor (PAL)	1 set	Professional Type
• System Rack	1 set	
• Chair	1 set	
(d) Video Tape Logging System		
• Video Tape Player (PAL)	1 set	Digital VTR, Professional Type
• 14-inch Color Monitor (PAL)	1 set	Professional Type
• Monitor Speaker	2 sets	with Amplifier
• Operation Desk	1 set	
• Chair	1 set	
(e) Power Supply Equipment		
• Automatic Voltage Regulator (2kVA)	2 sets	for Duplication Room & Portable Camera, Single Phase 220V
(f) Maintenance Equipment		
• Tool set	2 sets	
(g) Video Tape		
• 60 Minutes Tape	20 rolls	
• 30 Minutes Tape	40 rolls	
(h) Spare Parts/Unit	1 set	
(i) Installation Materials	1 set	

2-2-3 Basic Design Drawings

- Fig. 2-2-2 Block Diagram of Radio Recording Studio System
- Fig. 2-2-3 Block Diagram of CD Duplication System (EMA)
- Fig. 2-2-4 Block Diagram of CD Duplication System
(for Addis Ababa, Alemaya, Gambella, Semera, Dire Dawa, Harar, Mizan Teferi)
- Fig. 2-2-5 Block Diagram of CD Editing System
- Fig. 2-2-6 Floor Layout of Radio Recording Studio (EMA)
- Fig. 2-2-7 Floor Layout of Radio Recording Studio (Addis Ababa)
- Fig. 2-2-8 Floor Layout of EMA-Standard Radio Recording Studio (Alemaya, Gambella, Semera, Dire Dawa)
- Fig. 2-2-9 Floor Layout of Radio Recording Studio (Harar)
- Fig. 2-2-10 Floor Layout of Radio Recording Studio (Mizan Teferi)
- Fig. 2-2-11 Block Diagram of TV Recording Studio System (EMA)
- Fig. 2-2-12 Block Diagram of TV Master Control System (EMA)
- Fig. 2-2-13 Block Diagram of A/B Roll Editing System (EMA)
- Fig. 2-2-14 Block Diagram of Non-Liner Editing System
- Fig. 2-2-15 Block Diagram of Video Tape Logging System
- Fig. 2-2-16 Block Diagram of VHS Video Tape Duplication System
- Fig. 2-2-17 Block Diagram of Portable Video Recording System
- Fig. 2-2-18 Floor Layout of TV Recording Studio (EMA)
- Fig. 2-2-19 Floor Layout of VHS Tape Duplication Room (EMA)
- Fig. 2-2-20 Floor Layout of TV Studio and VTR Editing Room (Mekelle)



Legend
 ————— Digital Audio Signal
 ————— Analog Audio Signal
 - - - - - Sync. and Control Signal

Fig 2-2-2 Block Diagram of Radio Recording Studio System

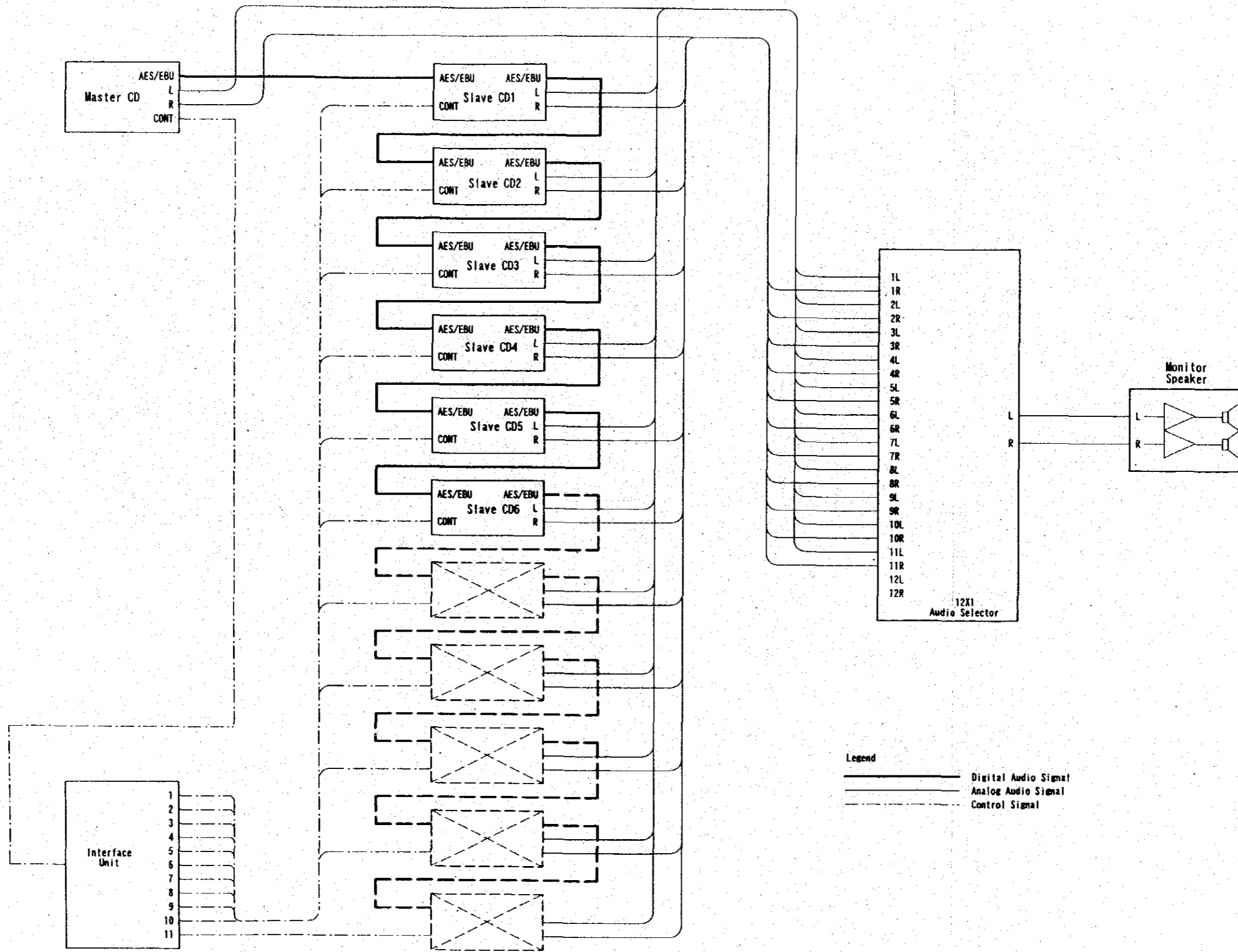


Fig 2-2-3 Block Diagram of CD Duplication System (EMA)

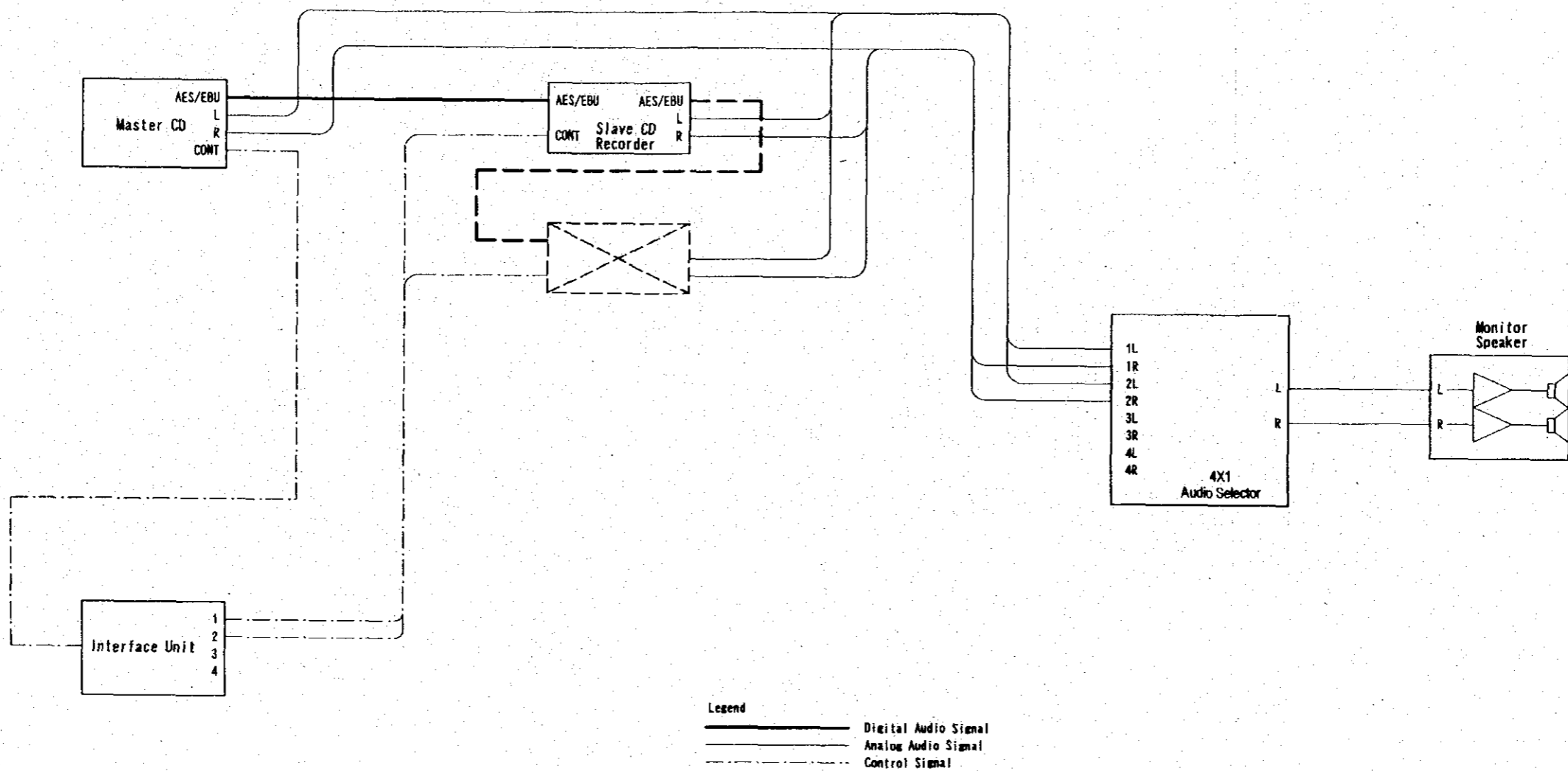
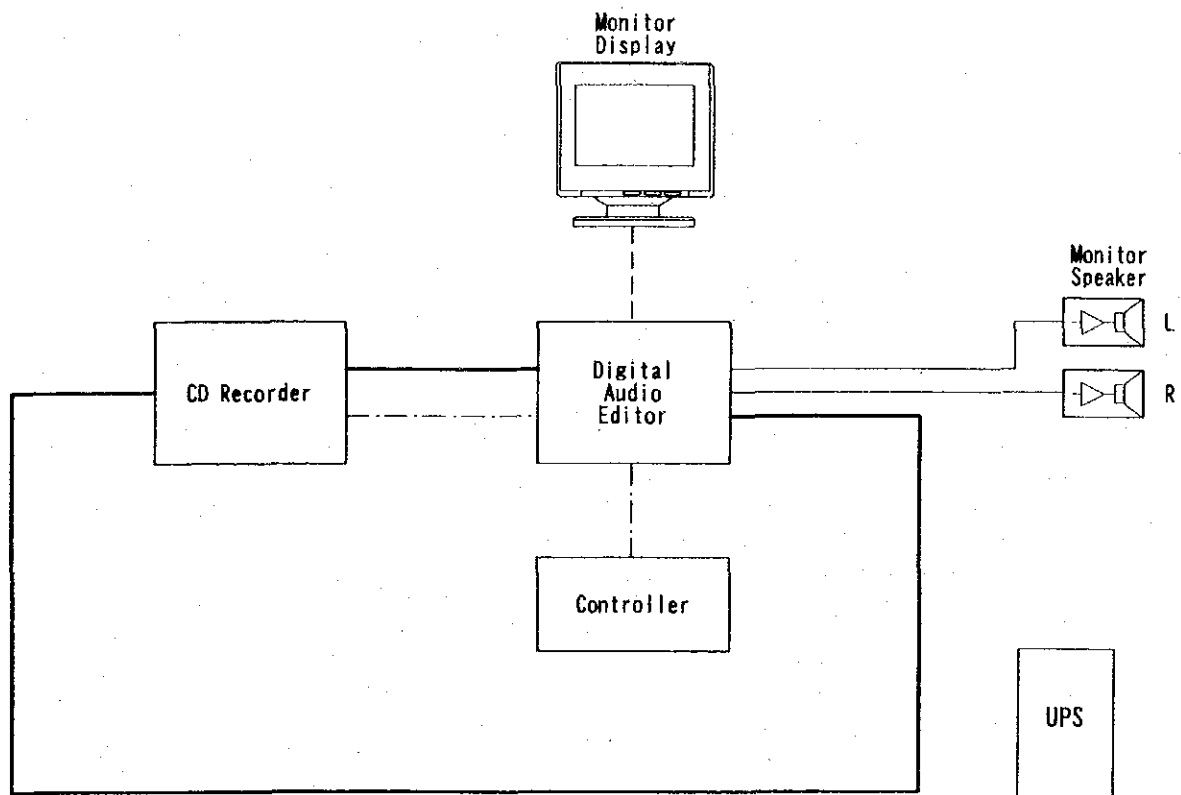


Fig 2-2-4 Block Diagram of CD Duplication System
(for Addis Ababa, Alemaya, Gambella,
Semera, Dire Dawa, Harar, Mizan Teferi)



Legend

- Digital Audio Signal
- Analog Audio Signal
- Control Signal
- Video Monitor Signal

Fig. 2-2-5 Block Diagram of CD Editing System

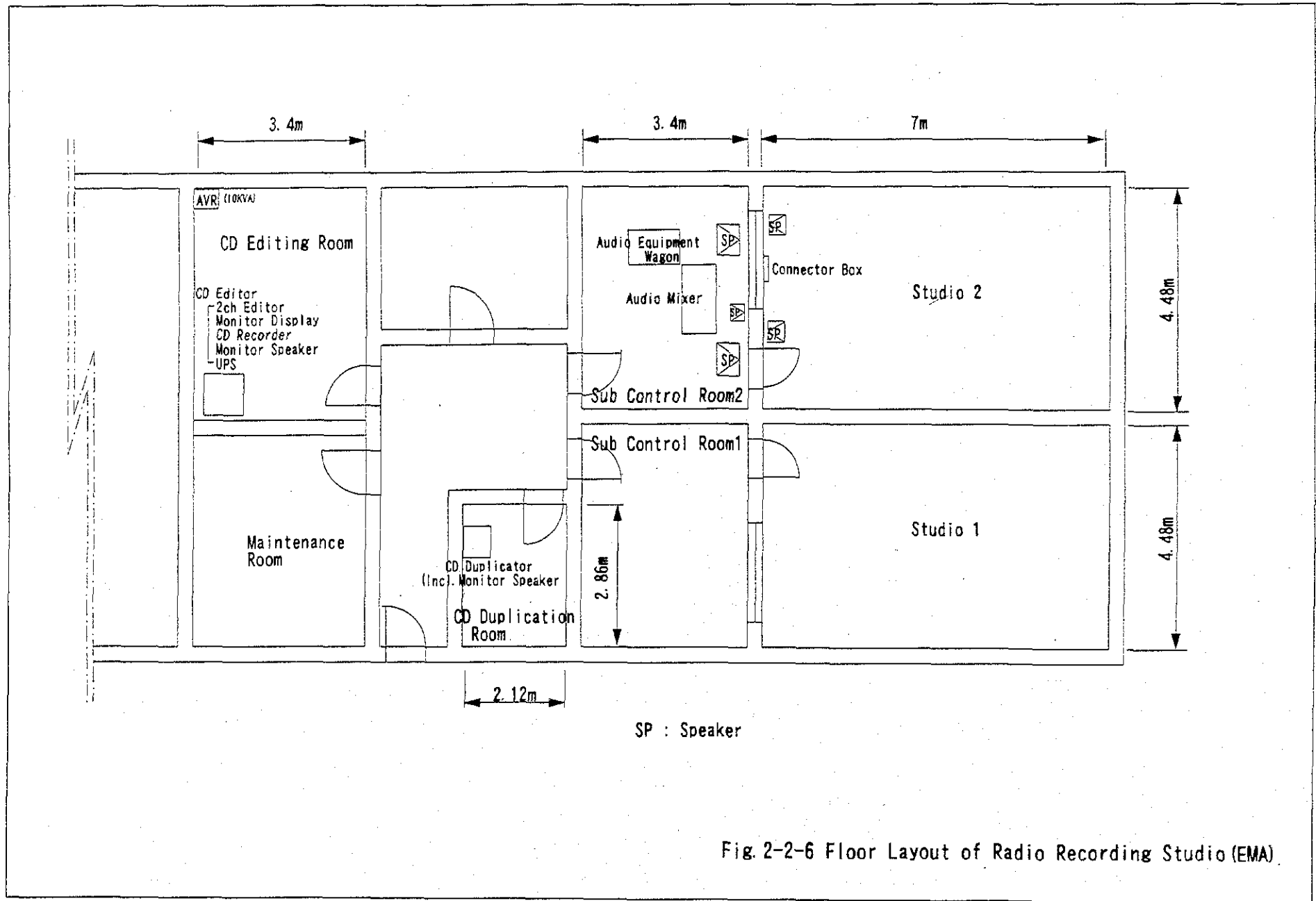


Fig. 2-2-6 Floor Layout of Radio Recording Studio (EMA)

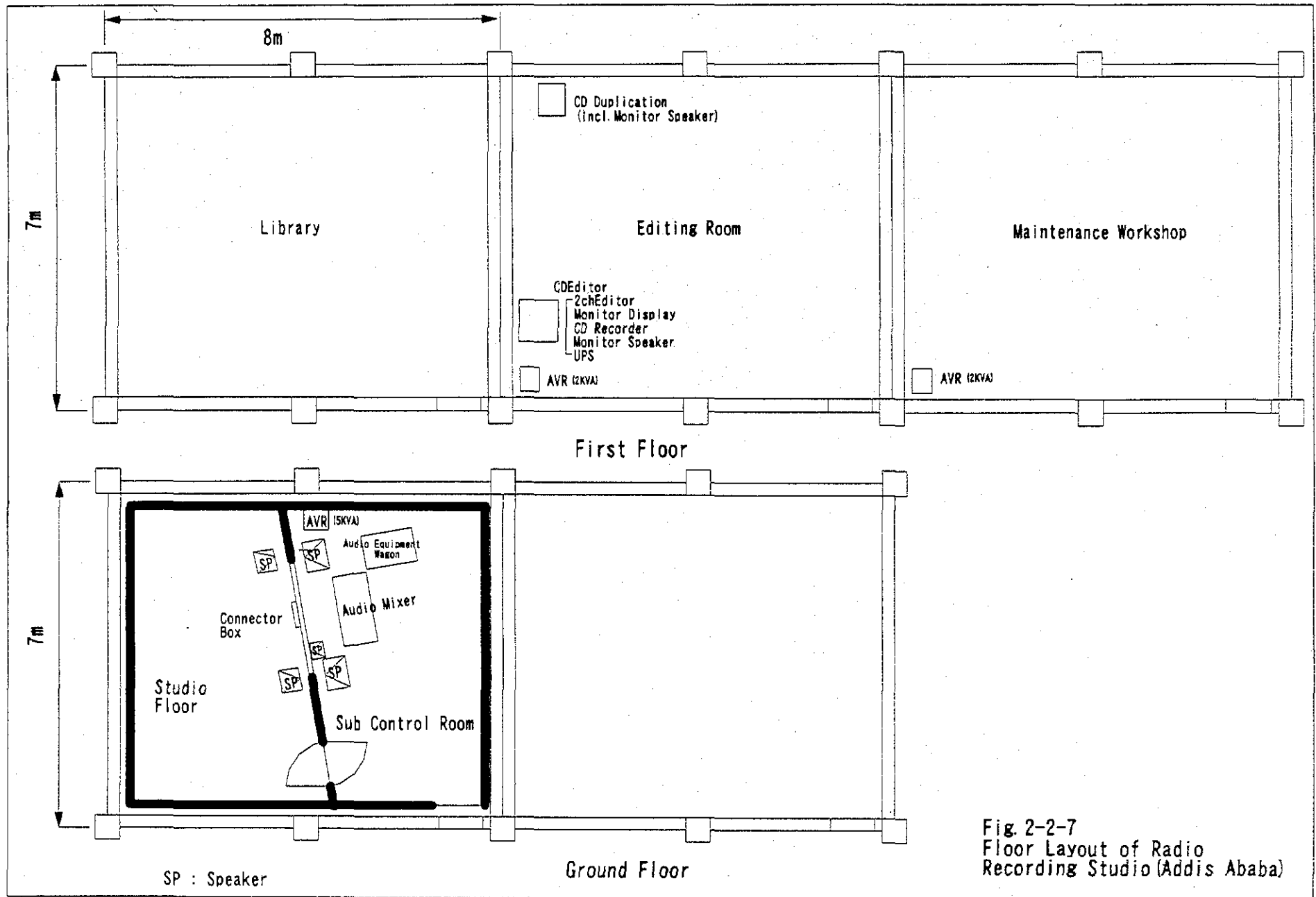


Fig. 2-2-7
Floor Layout of Radio
Recording Studio (Addis Ababa)

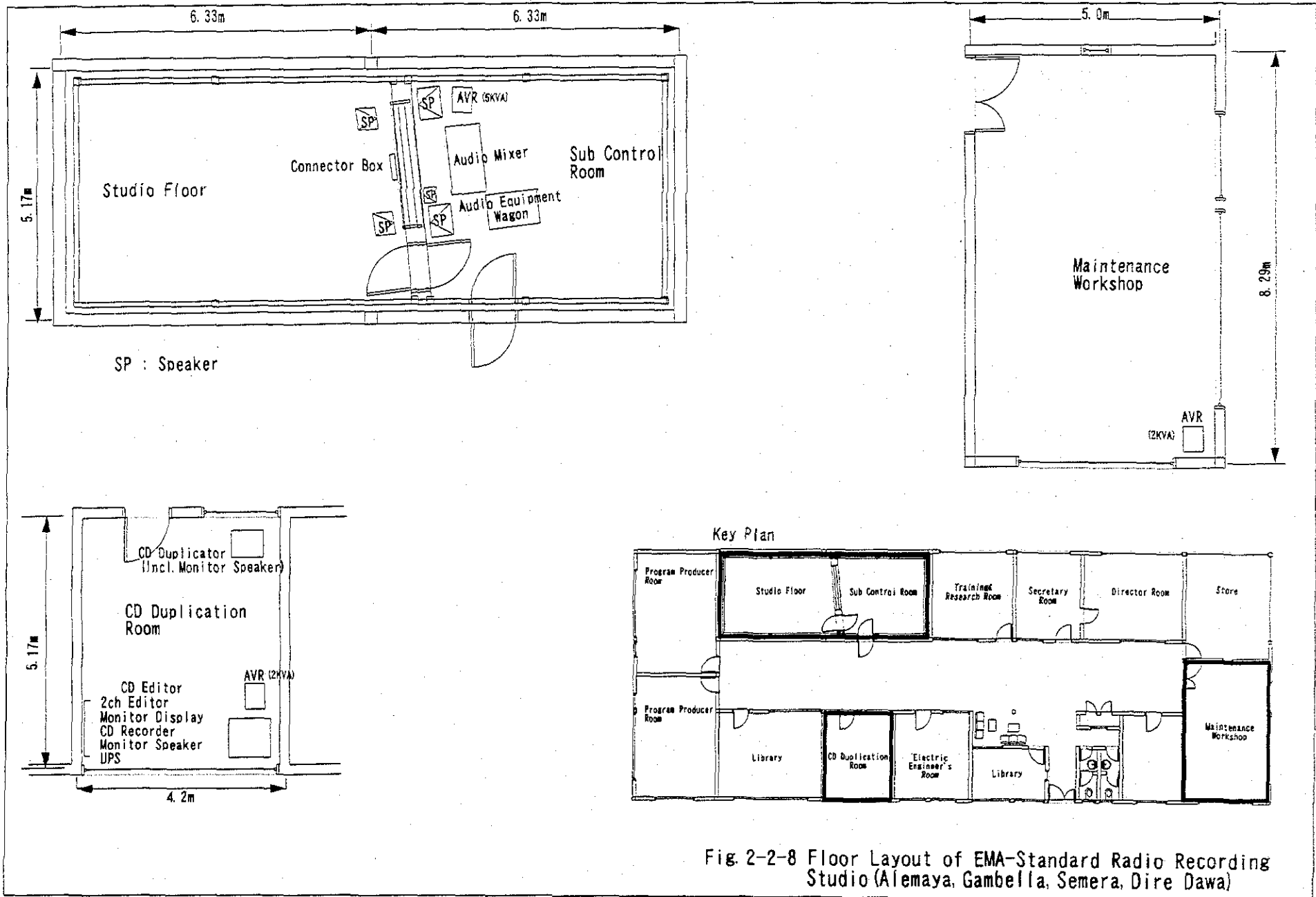


Fig. 2-2-8 Floor Layout of EMA-Standard Radio Recording Studio (Alemaya, Gambella, Semera, Dire Dawa)

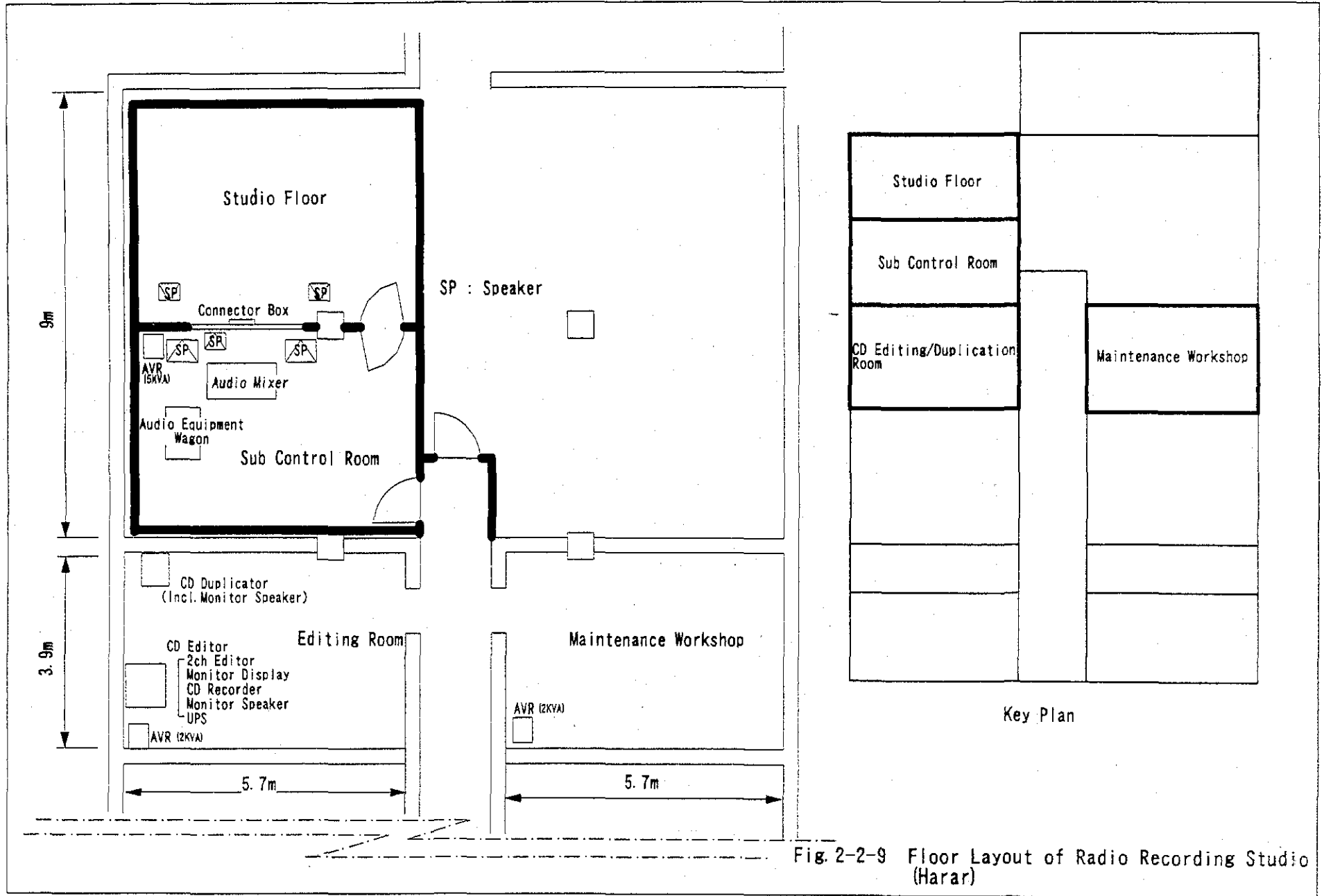


Fig. 2-2-9 Floor Layout of Radio Recording Studio (Harar)

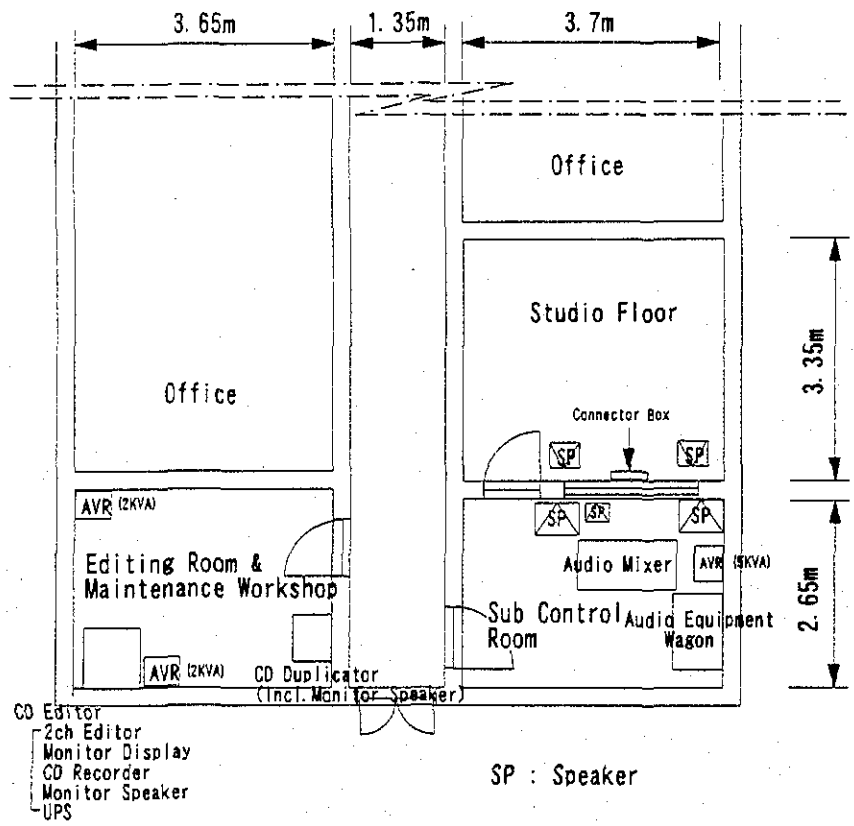


Fig 2-2-10 Floor Layout of Radio Recording Studio (Mizan Teferi)

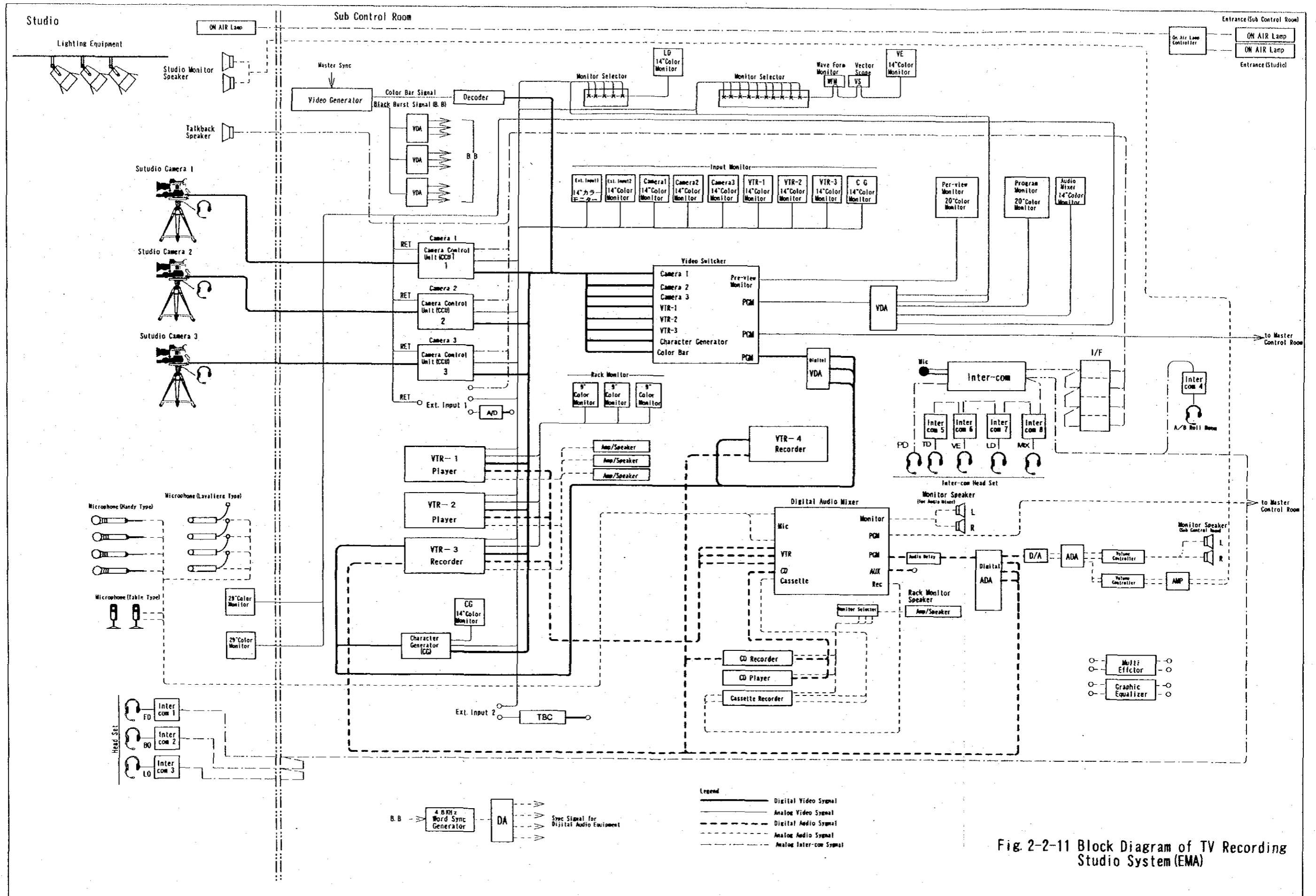


Fig. 2-2-11 Block Diagram of TV Recording Studio System (EMA)

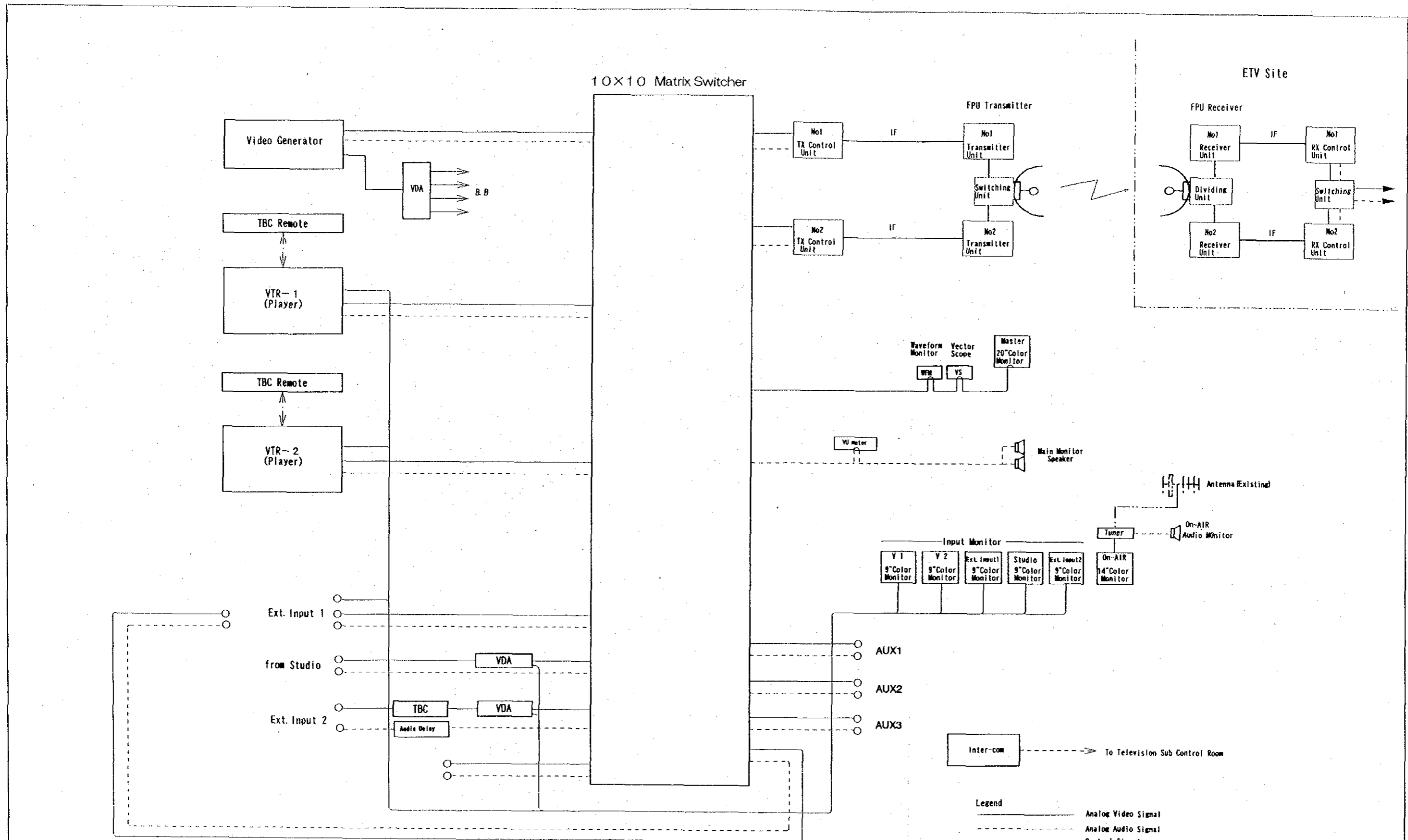


Fig 2-2-12 Block Diagram of TV Master Control System (EMA)

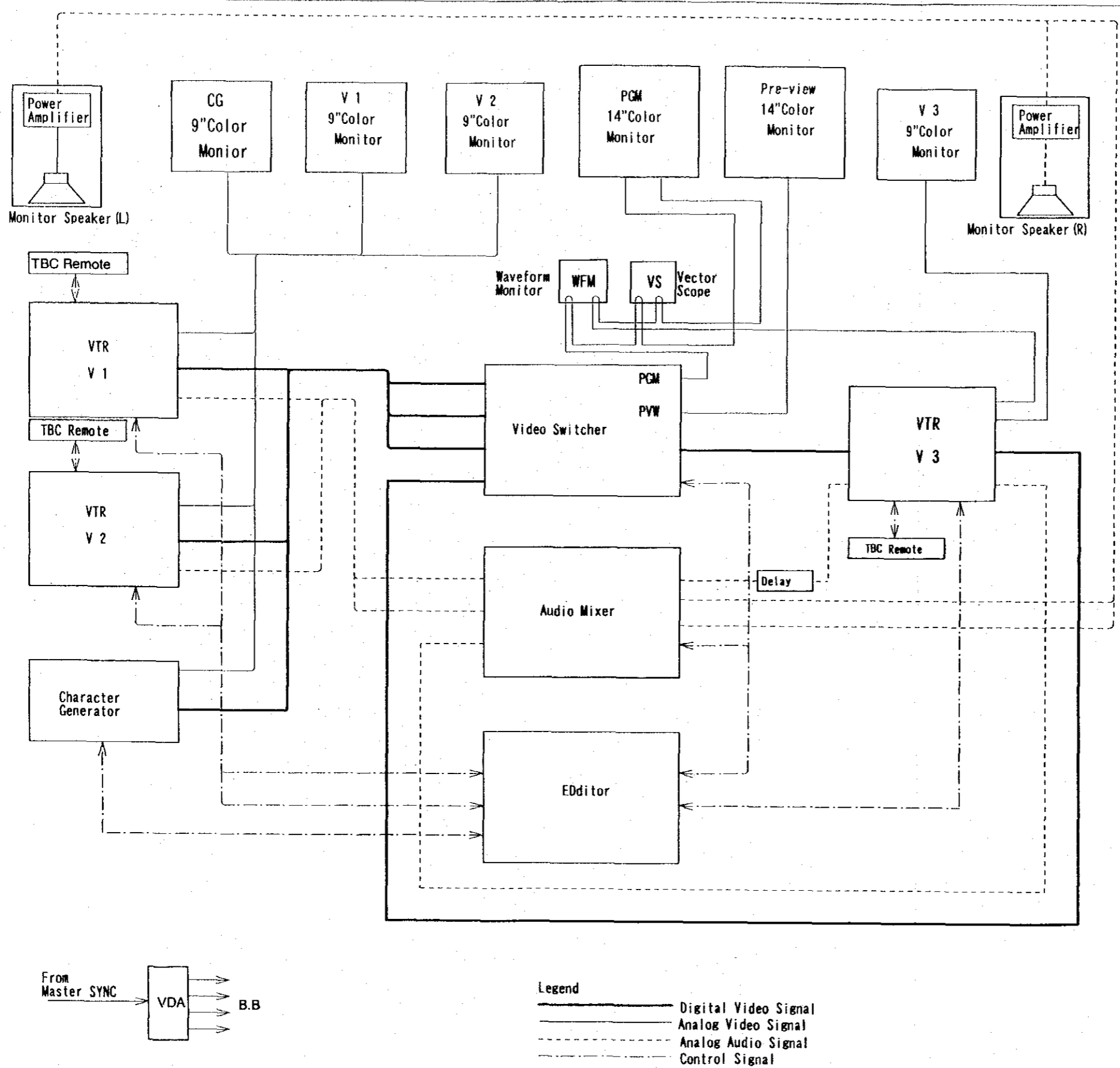


Fig 2-2-13 Block Diagram of A/B Roll Editing System (EMA)

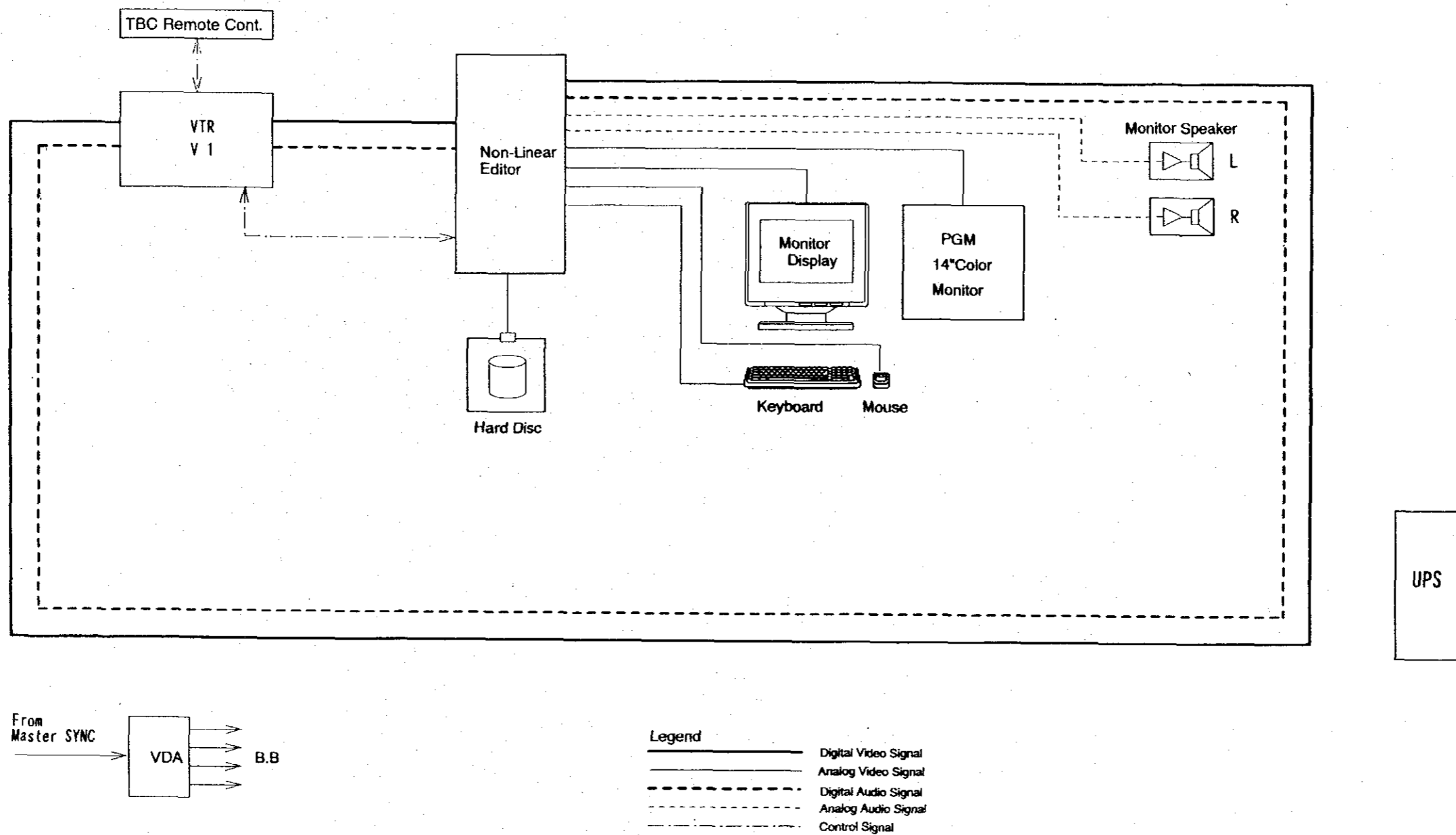
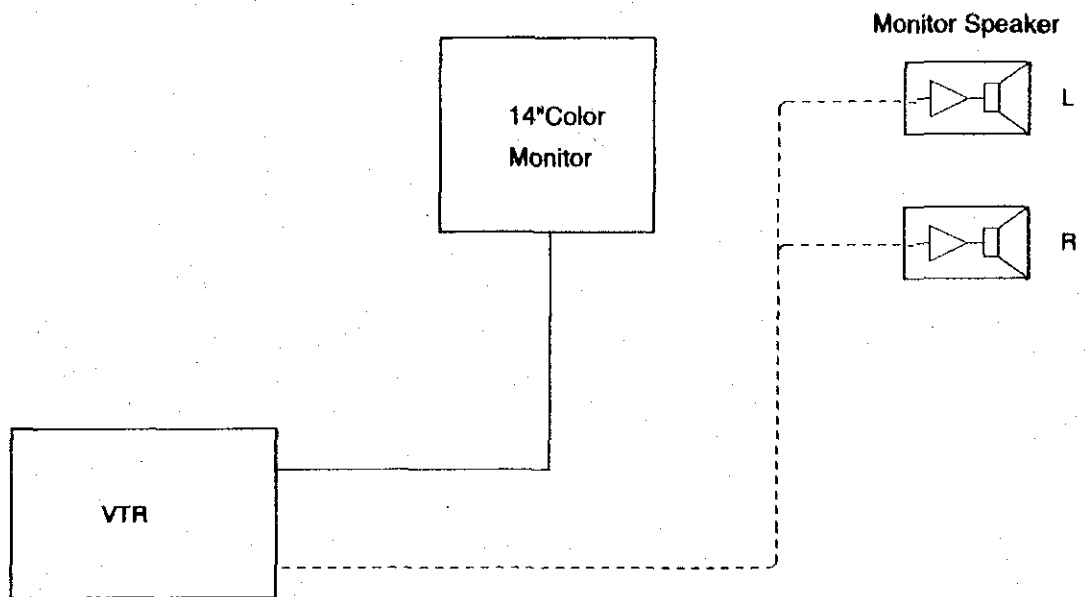


Fig. 2-2-14 Block Diagram of Non-Linear Editing System

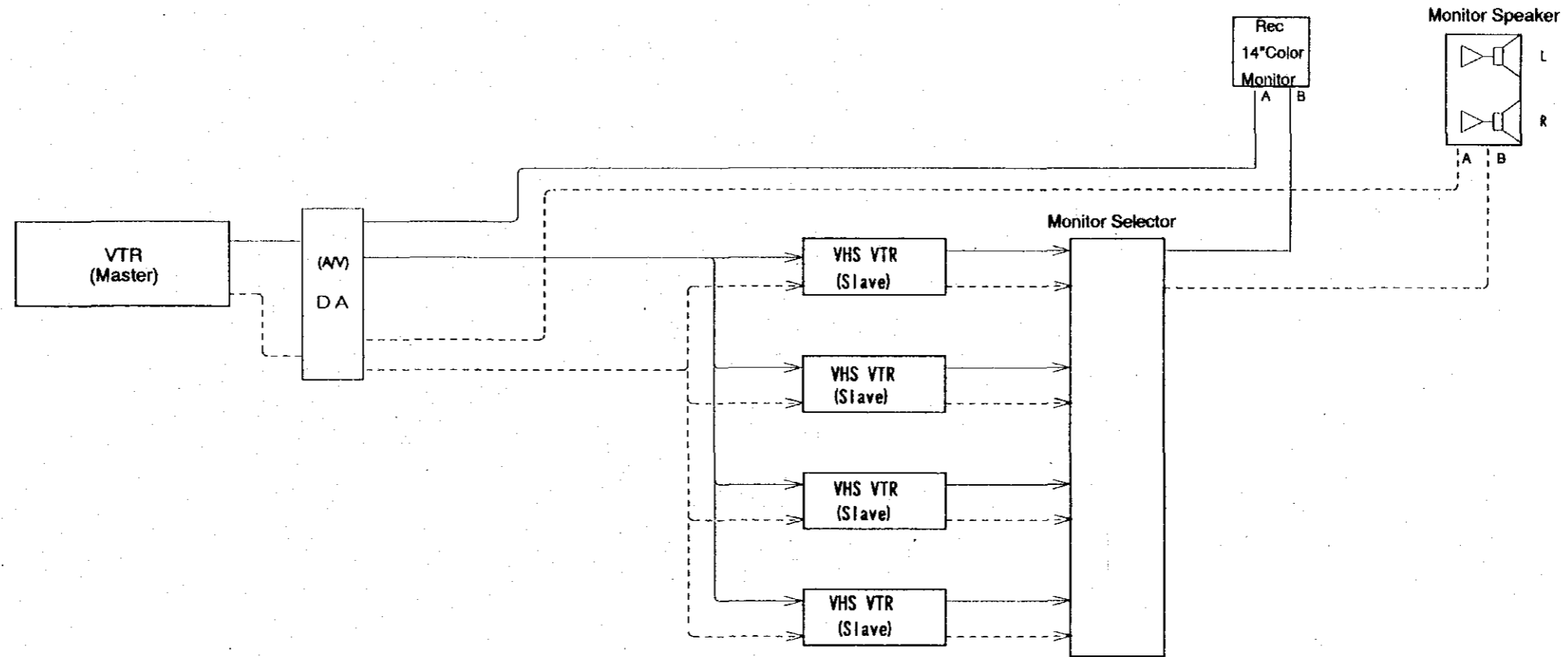


Legend

————— Analog Video Signal

- - - - - Analog Audio Signal

Fig 2-2-15 Block Diagram of
Video Tape Logging System



Legend

- Analog Video Signal
- - - - - Analog Audio Signal

Note

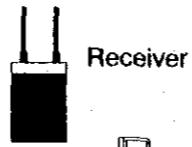
No of Slave VHS VTRs :4sets for EMA
 :2sets for Mekelle

Fig 2-2-16 Block Diagram of VHS Video Tape Duplication System

Wireless Microphone
(Handy Type)



Wireless Microphone
(Lavalier Type)



Receiver



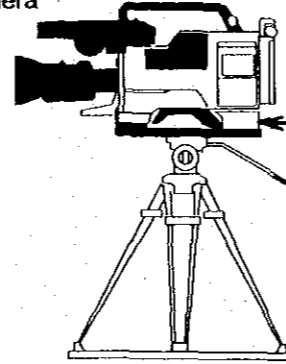
Rechargeable Battery



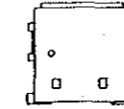
Light (Camera mount)



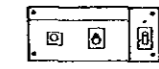
Portable Camera



Rechargeable Batteries

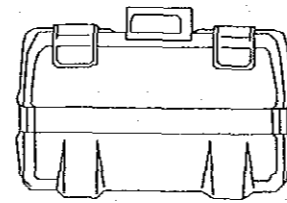
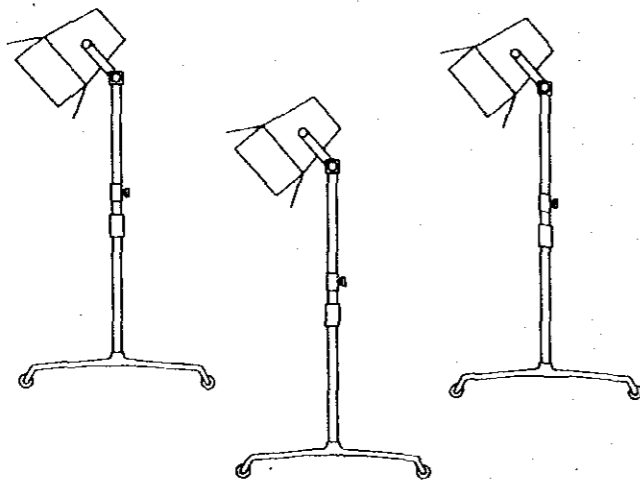


Battery Charger



AC Adaptor

Lighting Kit



Carrying Case

Fig. 2-2-17 Block Diagram of
Portable Video Recording System

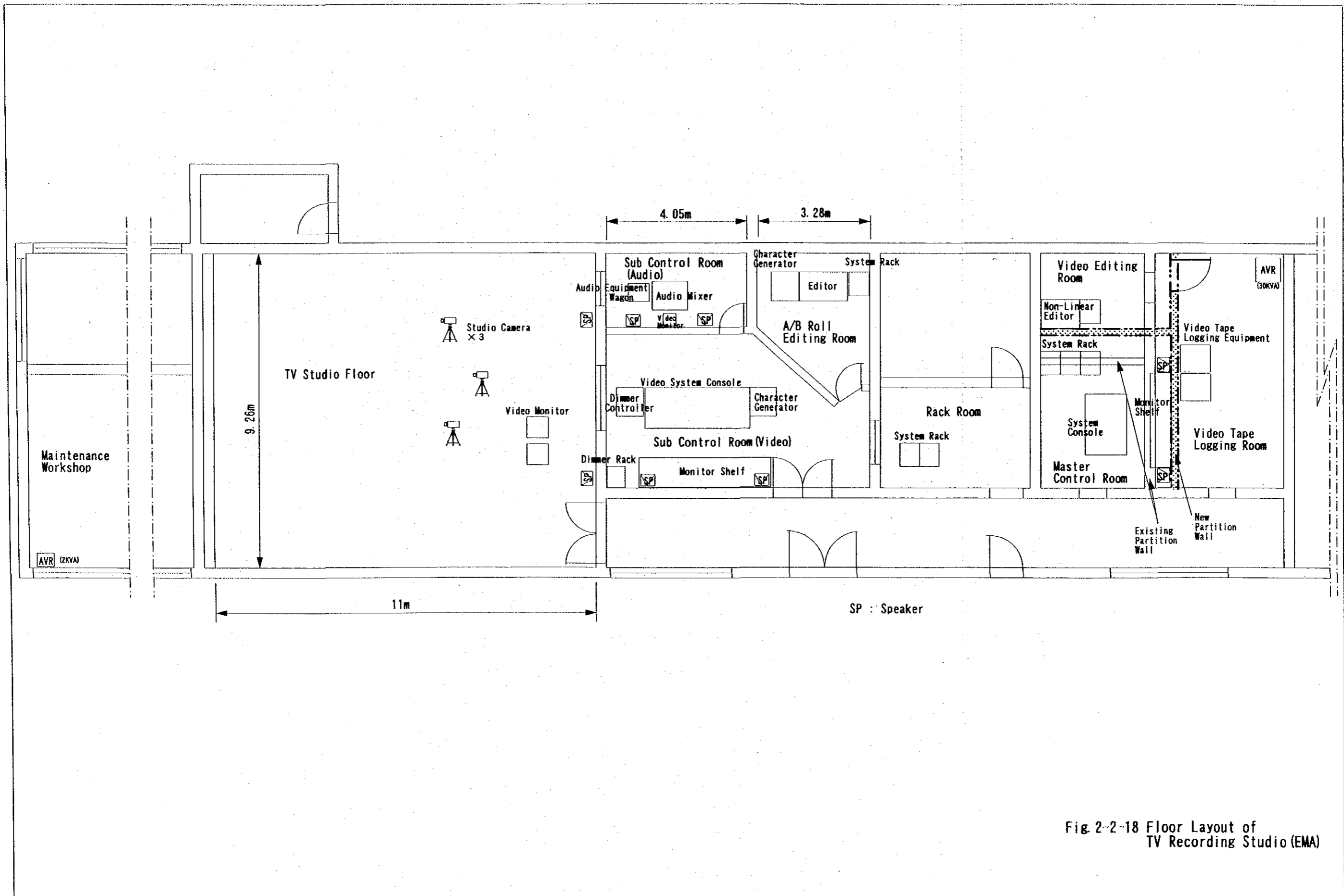


Fig 2-2-18 Floor Layout of TV Recording Studio (EMA)

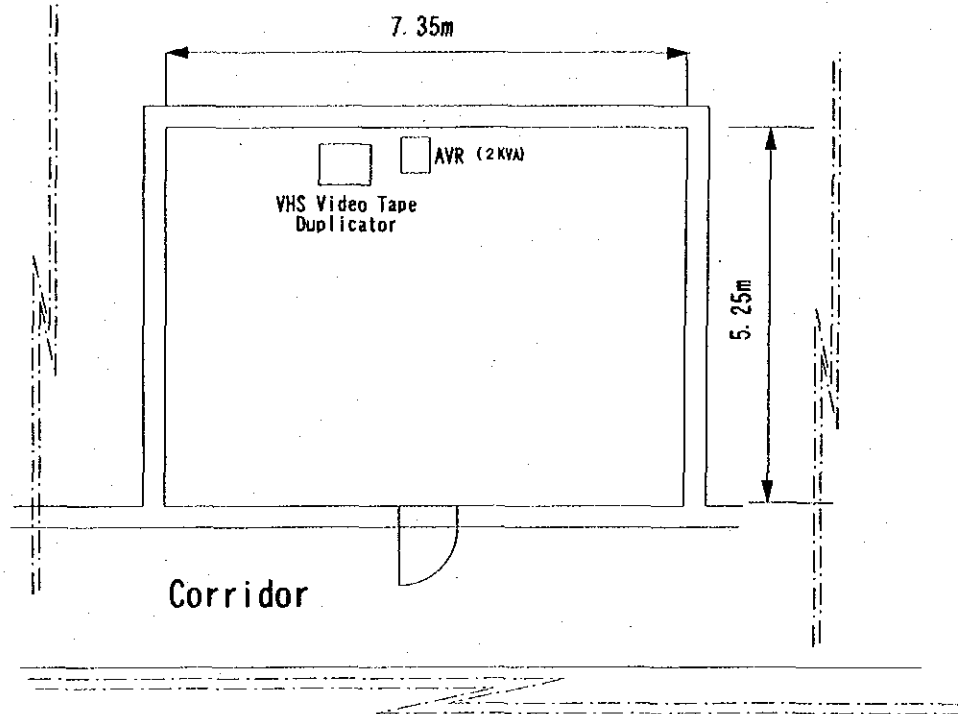


Fig. 2-2-19 Floor Layout of
VHS Video Tape Duplication Room (EMA)

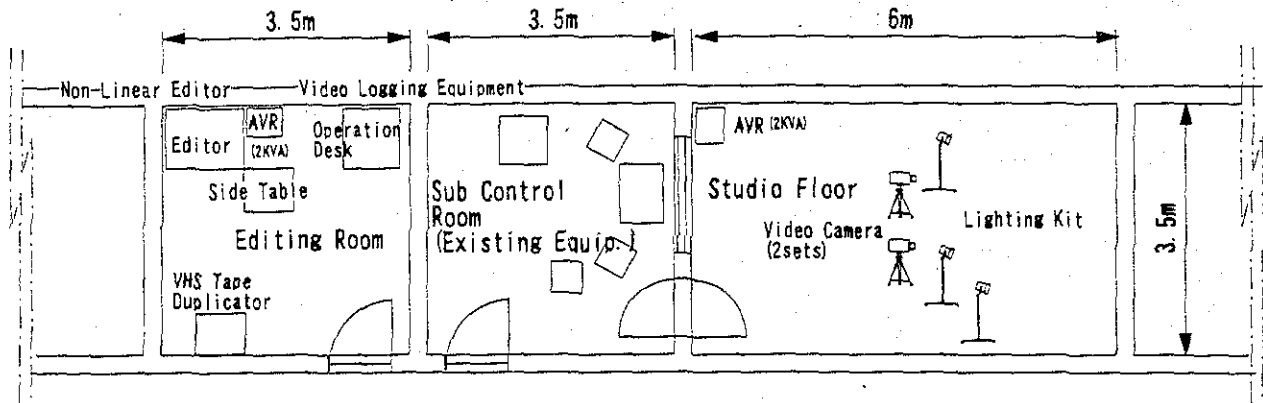


Fig 2-2-20 Floor Layout of TV Studio and VTR Editing Room (Mekele)

2-2-4 Installation Plan and Procurement Plan

2-2-4-1 Implementation Policy

In case this project is implemented under the Japan's Grant Aid, the following procedures will be taken. The project shall be approved by the Japanese Cabinet and the Exchange of Notes (E/N) shall be concluded between the government of Japan and the Ethiopian government. Then, the Ethiopian government will make a contract with a Japanese consultant firm, which will begin to conduct the detailed design of the project and draw up tender documents. After the completion of tender documents including detailed design drawings, the tender is announced. A Japanese equipment contractor selected through the tender will procure and install the equipment specified. The agreement between the Ministry of Education (MOE) and the consultant and the contract between MOE and the equipment contractor will take effect upon the verification thereof by the government of Japan.

(1) Implementing Agency

The Ministry of Education (MOE) will be implementing agency of this project and become a party to the contracts as the Ethiopian representative. The Educational Media Agency (EMA) will act as a liaison office to coordinate the entire works of the project.

It is recommended that the Ethiopian side establish a Steering Committee that will coordinate the works to be done on the Ethiopian side throughout the period from the detailed design stage to the completion/handover of the project. The Committee should preferably be composed of representatives from MOE, EMA, Regional Education Bureaus, JICA Ethiopia Representative Office, and other organizations concerned.

Important points to be facilitated by the Steering Committee are as follows:

- Appropriation of funds for the works to be done by the Ethiopian side and drafting of work plans according to the project implementation schedule.
- Identification and processing of governmental procedures required during the project implementation period.
- Identification and sorting out of permits and licenses related to the project and provision of pertinent information and assistance for the consultant firm.

(2) Consultant Firm

After the signing of the above E/N, the Ethiopian government will enter into a consultant agreement with a Japanese consultant firm who conducts the detailed design of the project and will apply to the government of Japan for verification of the agreement. After the verification of the agreement, based on this report on the project the consultant firm will prepare tender documents including detailed design drawings, while discussing details of the project with the Educational Media Agency and Regional Education Bureaus.

On completion of the tender documents, the consultant firm will seek to get their approval from the Ethiopian government.

Based on these tender documents, the consulting firm will supervise the works throughout the tendering/installation stage from the tendering for equipment procurement to the installation/trial operation/handover of the equipment.

(3) Equipment Contractor

An equipment contractor will be selected through tendering from Japanese trading companies that meet certain requirements and qualifications. The contractor will procure and install the equipment according to the specifications and within the period of execution specified in the contract. During the installation stage, the contractor will dispatch engineers specialized in each type of equipment to Ethiopia to do the installation work and explain the operation of equipment to the Ethiopian staff.

(4) Necessity for Equipment Installation Staff

Most of the equipment items to be procured under this project will be manufactured in Japan or third countries and shipped to the project sites in disassembled components if necessary to avoid damages during transportation. To set up the studios with these equipment items in working condition, they need to be reassembled, installed, and adjusted on respective sites.

The installation work will involve the handover procedures such as giving the instruction and training regarding equipment, operation, inventory of the equipment, etc. Therefore, dispatch of foreign engineers will be necessary to handle such jobs. The number of engineers and the duration of dispatch will be kept to a minimum, by employing local engineers and technicians as much as possible.

2-2-4-2 Implementation Conditions

(1) Ensuring Safety throughout Implementation Period

In implementing the project, the latest information with regard to the public security around the project sites should be checked to ensure safety.

If ensuring safety is difficult or impossible, Japanese governmental agencies (the Embassy by Japan in Ethiopia, JICA Ethiopia Representative Office, Ministry of Foreign Affairs, and JICA Headquarters) will discuss the problems with the Ethiopian counterparts (Ministry of Education, EMA, Regional Education Bureaus, etc.) to determine alternative plans.

(2) Conducting OJT

The staff of EMA and Regional Education Bureaus need to be fully trained especially with regard to the operation, periodic maintenance, and parts replacement of the digital equipment to be procured under this project.

OJT will be conducted by inviting as many persons as possible from EMA and Regional Education Bureaus at the time of installing and adjusting the equipment.

(3) Operations in High Places

The STL (studio-to-transmitter link) will be installed on a steel tower at 40 meters above the ground.

For such operations, the workers must wear helmets and safety belts, and a "Men at Work in High Place" warning sign should be placed at the foot of the tower while placing a watchguard on the ground.

In case of rain or strong wind, extra precautions need to be taken, or work should be suspended as necessary.

2-2-4-3 Scope of Works

The scopes of works to be done by the Japanese and Ethiopian sides respectively are defined as follows, in case the project is implemented under Japan's grant aid.

(1) Works to be Done by the Japanese Side

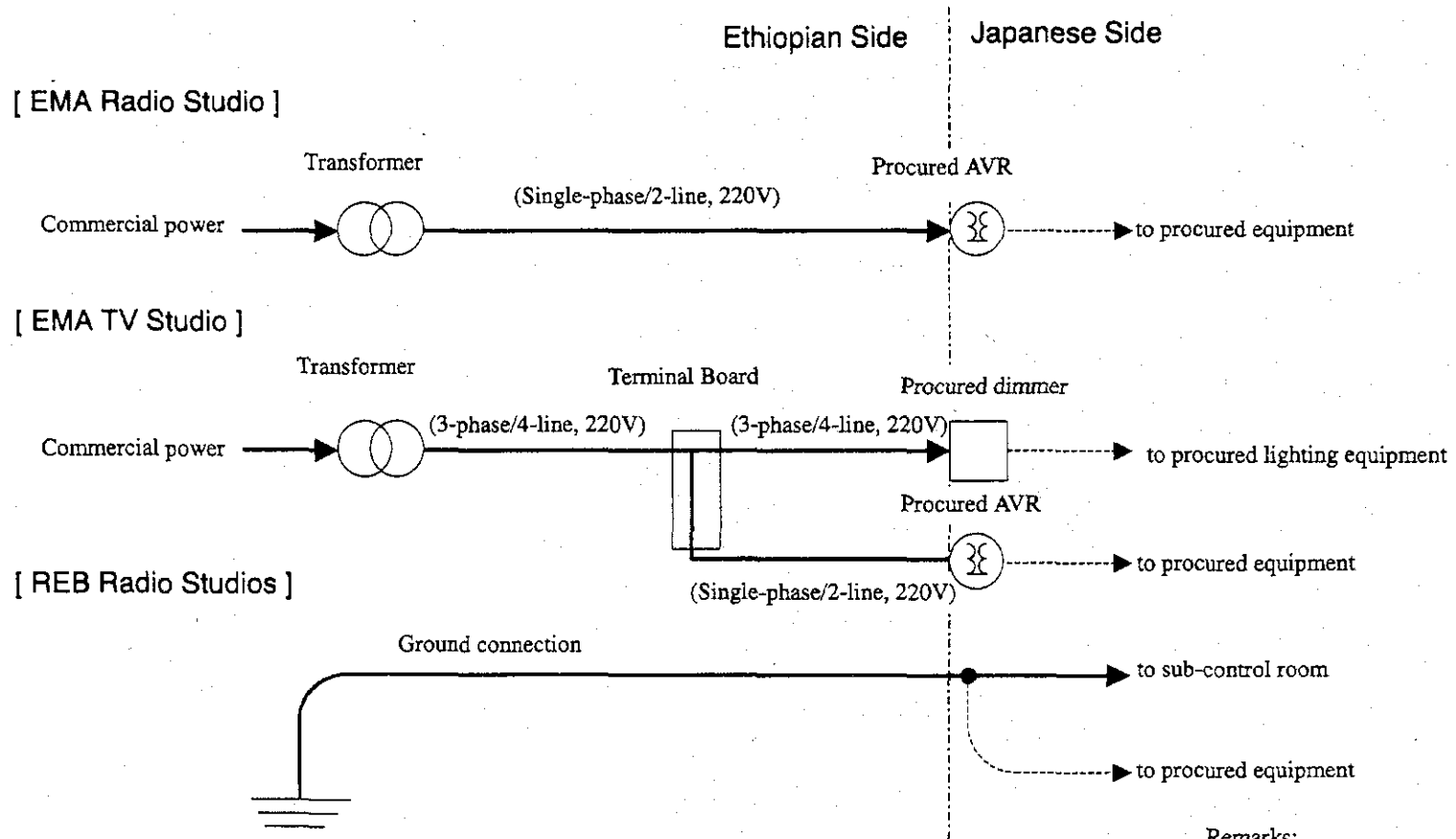
- 1) Procurement, installation, wiring and adjustment of equipment
- 2) Removal of old STL and installation of new STL

Japanese staff will remove the STL receiver installed in the Ethiopia Television (ETV) building and install new equipment under the supervision of Ethiopian staff.

- 3) As for the installation of AVR, the Ethiopian side will install the power cables up to the input of AVR, and the Japanese side will connect the output side. (Refer to Fig. 2-2-21 Boundary of Works for Electrical Installation & Grounding.)
- 4) As for the installation of lighting equipment in EMA TV Studio, the Ethiopian side will install the cables up to the input of the dimmer system, and the Japanese side will connect the output side.

(2) Works to be Done by the Ethiopian Side

- 1) Construction of studio buildings (Alemaya, Dire Dawa, and Semera) or renovation of existing radio studios (Addis Ababa, Harar, and Mizan Teferi) for the installation of the equipment to be procured by the project.
- 2) Electrical installation (See sub-clauses 3) and 4) of Section (1) above.)
- 3) Installation of grounding cables (up to sub-control room)
- 4) Removal of existing equipment from the rooms in which the Japanese side will install new equipment. (Removal must be finished before commencement of installation work.)
- 5) The Ethiopian side will install the CD players to eleven radio transmitting stations.



Remarks:

- - - - - : Works on Japanese side
- ——— : Works on Ethiopian side
- Power source frequency: 50Hz
- Transformers and power cables should be appropriate for the load capacities of equipment.

Fig. 2-2-21 Boundary of Works for Electrical Installation & Grounding

2-2-4-4 Consultant Supervision

Pursuant to the grant aid guidelines of the government of Japan, the consultant firm will organize a project team, which will facilitate the smooth implementation of the project from detailed design to supervising the procurement/installation works to handover of equipment. During the supervisory stage on sites, the consultant firm will dispatch supervisors with proper technical qualifications who will give advice and recommendations to the equipment contractor as necessary to ensure that the project will be implemented smoothly without delay.

(1) Main Policies on Supervisory Plan

The consultant firm will work closely with the agencies and representatives of both countries in order to keep the project implementation on schedule by giving to the Ethiopian side:

- Advice and guidance as necessary so that the equipment will be procured and installed according to the tender documents,
- Planning of sufficient training on the operation and maintenance of equipment, and
- Advice and guidance as necessary with regard to the maintenance of equipment after handover to facilitate smooth operation.

(2) Scope of Supervisory Works

- **Assistance Regarding Contract**

The consultant firm will prepare design drawings and tender documents, decide the forms of contract, prepare draft of the contract, check the contents of bill of quantity, and witness the signing of the contract.

- **Confirmation and Inspection of Documents and Materials Submitted by Equipment Contractor**

The consultant firm will check drawings, material samples, and other items submitted by the equipment contractor and inspect them as necessary.

- **Guidance for Installation Work**

The consultant firm will review the work schedule and the work list and give guidance to the equipment contractor and report to the Ethiopian agencies.

- Assistance in Payment Procedures

With regard to the fees to be paid to the equipment contractor during or after the completion of work, the consultant firm will check the contents of each invoice against the progress of work to facilitate the payment.

- Inspection and Attendance

The consultant firm will inspect each work for quality and finish, and give instructions to the equipment contractor as necessary. Also, it will check that the works are progressing according to the stipulations on the contract and attend the various tests and inspections to be conducted during the period from the commencement to completion of works, as well as the final acceptance inspection of the project. The work of the consultant will end upon the approval by the MOE/EMA. In addition, the consultant will report the progress of works and information necessary for payment procedures and handover to the officials concerned of the government of Japan.

Fig. 2-2-22 shows the supervisory system and the relationship of the agencies concerned in this project.

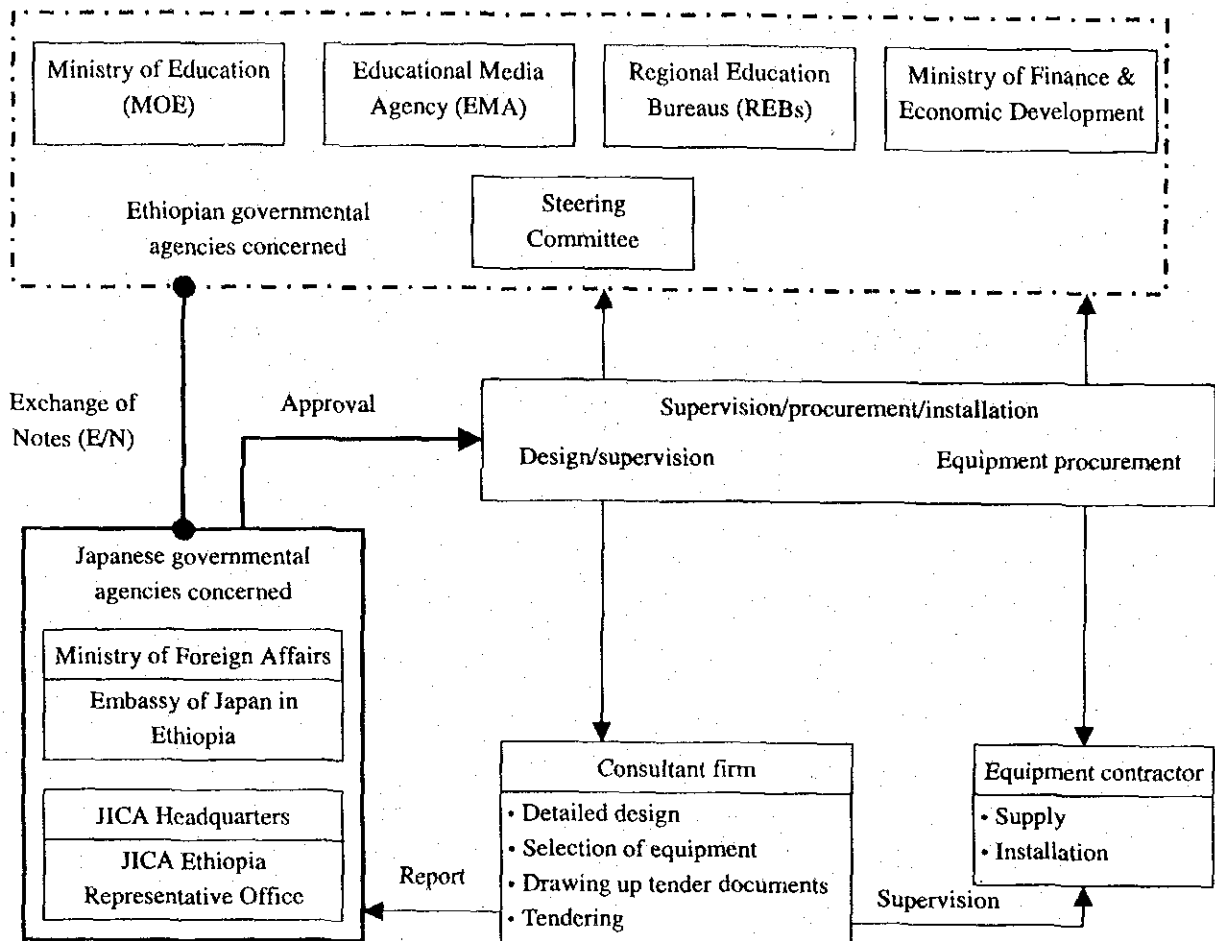


Fig. 2-2-22 Supervisory System and Organizations

2-2-4-5 Quality Control Plan

According to the policies established in the basic design, the consultant firm will control the quality of works throughout the process of the project implementation.

“Quality control” in this case refers to and bases on the definition of the quality control terminology of Japan Industrial Standard - “a system of means to economically produce goods or services in the quality required by the buyer thereof.”

The quality control activities to be carried out by the consultant consist of the following:

- (1) Examine various drawings, technical documents, samples, and other items submitted by the equipment contractor and check their conformity to the standards and requirements stipulated on the drawings and specification of the tender documents.

(2) Entrust a reputable third-party testing institution to inspect the equipment procured before shipment.

- Check the packing list against the equipment list attached to the contract.
- Check the actual equipment against the packing list.
- Issuance of Inspection Certificate

2-2-4-6 Procurement Plan

(1) Procurement Plan

In principle, equipment to be procured under Japan's grant aid must be sourced from Japan or the recipient country (Ethiopia).

However, radio/ TV production equipment with the latest electronics components is not produced in Ethiopia.

Most of the existing equipment items at EMA and Regional Education Bureaus are made in Japan, while others are made in other countries, such as Switzerland and the United States. EMA and Regional Education Bureaus are requesting Japanese products, as they trust them in terms of performance, reliability, stable supply and follow-up (Japanese products come with 10-year warranties for spare parts supply).

(2) Equipment Transportation Plan

Equipment shipped from Japan will be unloaded at Djibouti Port and therefrom transported by land to each project site. The number of days to take for shipping the equipment from Japan to each site is predicted as follows:

Japan – Djibouti Port

There are no regular ocean freight services directly connecting Japan and Djibouti. There is an indirect service from Japan to Djibouti once a week via Malaysia and Dubai Port where containers from Japan are transferred to a ship that goes to Djibouti Port. Shipping via this route takes about 30 days.

Djibouti Port is relatively adequately equipped for handling containers and other types of cargos. It has a warehouse to store goods into Ethiopia free of charge for up to 30 days. Customs clearance by the Ethiopian and Djibouti customhouse authorities is held at this port, taking a relatively short period of three to five days.

As mentioned earlier, however, the equipment will be stored in the bonded warehouse without going through the customs clearance procedure if the tariffs have not been paid. Thus, the Ministry of Education needs to pay tariffs at the rates appropriate for each equipment item to the Ministry of Revenue without delay.

Documents needed for customs clearance are as follows:

- Bill of Lading
- Invoice
- Packing List

	<u>Transportation</u>	<u>Distance</u>	<u>Time needed</u>
Djibouti Port to Ethiopian border	Truck	220km	Approx. 18 hours

At the Djibouti/Ethiopian border, goods are allowed to enter Ethiopia relatively easily (about half a day) if the documents prepared for customs clearance are in place.

<u>Ethiopian border to</u>	<u>Transportation</u>	<u>Distance</u>	<u>Days needed</u>
EMA site	Truck	850km	1 to 2
Addis Ababa Site	Truck	850km	1 to 2
Dire Dawa Site	Truck	800km	1 to 2
Harar Site	Truck	850km	1 to 2
Alemaya Site	Truck	800km	1 to 2
Gambella Site	Truck	1,600km	6 to 7
Mizan Teferi Site	Truck	1,450km	6 to 7
Semera Site	Truck	100km	1
Mekelle Site	Truck	900km	3 to 4

- Road Condition

Of the 220-km road from Djibouti Port to the Ethiopian border, about 100 kilometers are paved with asphalt and the remaining 120 kilometers are unpaved.

- From the Border to Each Site:
 - EMA and Addis Ababa:
The main road connecting the sites to Djibouti Port is mostly paved with asphalt.
 - Dire Dawa, Harar, and Alemaya:
Unpaved
 - Gambella:
The route goes through Addis Ababa, up to which the roads are paved. However, the road between Addis Ababa and Gambella is unpaved for the most part.
 - Mizan Teferi:
The route goes through Addis Ababa, up to which the roads are paved. However, the road between Addis Abba and Mizan Teferi is unpaved for the most part.
 - Semera
The site is situated on the paved main road connecting Djibouti and Addis Ababa.
 - Mekelle:
Mostly paved except for small sections

Although the equipment will be delivered via partially unpaved roads, the condition is not too poor to cause major hindrance in transportation.

Around 45 days should be allowed for transporting the equipment to each site.

2-2-4-7 Implementation Schedule

The supervisory agency of this project on the Ethiopian side will be the Ministry of Education, and the Educational Media Agency (EMA) will be in charge of the execution of the project.

(1) Detailed Design Stage

Based on the basic design, the consultant firm will prepare documents for tendering, comprised of detailed design drawings, specifications, estimation/budget sheets, instructions to tenderers and other documents. The consultant will have thorough

discussions with the agencies concerned of the Ethiopian government at the initial, middle, and final phases of the detailed design stage and conclude its works for that stage upon the submission of final results (tender documents including detailed design drawings, etc.) and approval thereof by the relevant authorities.

(2) Tender/Contract Stage

After the completion of detailed design stage, a tender will be held in the presence of personnel concerned. The bidder who submits the lowest price, which must be deemed justifiable, will be selected and conclude a contract with MOE/EMA.

(3) Manufacture and Installation Work

After the signing of the contract and the verification thereof by the government of Japan, the equipment contractor will begin manufacture of equipment and install the equipment at each site.

(4) Implementation Schedule

In case the project is to be implemented at three sites (EMA Radio Studio, Gambella Radio Studio, and EMA TV Studio), implementation time schedule is shown below. It is estimated that a total of 11 months will be needed from signing of the consultant agreement until completion of the project and handover of the equipment.

Month	1	2	3	4	5	6	7	8	9	10	11	12
Detailed design	■ (Final verification of project contents)											
		□ (Preparation of tender documents)										
			■ (Presentation/confirmation of tender documents)									
				□ (Tendering)								
					■ (Tender Evaluation)							
Procurement/Installation												

■ : Works in Ethiopia

□ : Works in Japan

2-3 Obligations of the Ethiopian Side

In the case where the project is implemented under the Japan's grant aid, the obligations of the Ethiopian side shall be as follows;

- (1) Appropriation and payment of customs duties to be imposed on the equipment to be procured and imported into Ethiopia under this project (Ministry of Education).
- (2) Obtaining of all pertinent legal permits and licenses required in Ethiopia (Ministry of Education, EMA, Regional Education Bureaus).
- (3) Securing of a storage space for the equipment to be procured under this project at each site (EMA, Regional Education Bureaus).
- (4) Allocation of budget and personnel to be needed to operate and maintain the equipment to be procured under this project (EMA, Regional Education Bureaus).
- (5) Proper and efficient maintenance and operation of the equipment procured (EMA, Regional Education Bureaus).
- (6) Issuance of Authorization to Pay (A/P) and payment of banking fees incurred in connection with the issuance and amendment of the A/P (EMA, Regional Education Bureaus).
- (7) All other works on the Ethiopian side stipulated on the Exchange of Notes (Ethiopian parties).

Works to be done by the Ethiopian side at each project site are shown in the Table 2-2-5.

Table 2-3-1 shows the cost for construction /modification of Studio building at each site done by the Ethiopian side.

Table 2-3-1 Cost for Construction/modification of Studio Building

Project Site	Cost for Construction/modification of Studio Building	Appropriation
[Radio Studio]		
EMA Radio Studio	Completed	—
Gambella Radio Studio	1,500,000 Birr (Completed)	—
Harar Radio Studio	287,393 Birr	Secured
Semera Radio Studio	1,500,000 Birr	Secured
Addis Ababa Radio Studio	1,000,000 Birr	Secured
Dire Dawa Radio Studio	1,500,000 Birr	Secured
Mizan Teferi Radio Studio	85,000 Birr	Not secured
Alemaya Radio Studio	1,500,000 Birr	Not secured
[TV Studio]		
EMA TV Studio	Completed	—
Mekelle TV Studio	10,000,000 Birr ~ 20,000,000 Birr	Not secured

2-4 Project Operation Plan

2-4-1 Studio Operation/Maintenance Staff

(1) Present Status of Studio Operation/Maintenance Staff

Table 2-4-1 shows the present status of program production staff at each studio:

Table 2-4-1 Studio Operating/Maintenance Staff

Site	Producers	Production engineers	Maintenance engineers
EMA Radio Studio	9	6	7
Gambella Radio Studio	8 (including teachers)	4	—
Harar Radio Studio	6	3	—
Semera Radio Studio	18 (including teachers)	—	—
Addis Ababa Radio Studio	20 (including teachers)	6	—
Dire Dawa Radio Studio	5	3	—
Mizan Teferi Radio Studio	6 (including teachers)	—	—
Alemaya Radio Studio	6 (including teachers)	—	—
EMA TV Studio	6	12	Same personnel as the radio studio
Mekelle TV Studio	—	—	—

(2) Personnel Plan after the Project Implementation

1) Producers

(a) Radio Producers

Each radio studio employs at present six or more producers who can produce programs at EMA and the Regional Education Bureaus. Thus, hiring of additional producers will not be necessary.

Regional Education Bureaus' staff, as well as principals and other faculties of schools in the respective regions, are being trained at EMA to become producers. Instead of hiring new personnel to secure the producers for the future programs, each studio can send teachers to EMA to participate in its annual training seminar to fill the posts.

(b) TV Producers

EMA currently employs six producers in charge of the production of educational programs in five subjects and does not need to hire additional producers.

Mekelle Studio, on the other hand, needs to secure TV producers by sending the radio producers of Mekelle Radio Studio and school teachers of the region to EMA to participate in the TV producers' training program or have them trained by ETV staff.

2) Program Production Engineers

(a) Radio Program Production Engineers

Each radio studio will need at least three production engineers on a regular basis to operate the equipment to be procured under this project (Although two can run the equipment, a relief engineer will be needed).

EMA is employing six engineers to operate its two studios, who can sufficiently operate the improved studios without additional personnel. Each of Gambella, Harar, Addis Ababa, and Dire Dawa Radio Studios also has three or more engineers, who have completed the radio engineers' training course at EMA to acquire certain skills.

Semera, Mizan Teferi, and Alemaya Radio Studios need to hire three production engineers each, at least one of whom should preferably be experienced in radio program production.

(b) TV Program Production Engineers

EMA has 12 production engineers and does not need to hire additional personnel.

Considering the scale of equipment to be procured for Mekelle TV Studio, it will need three additional engineers (2 cameramen and one VTR editor).

3) Maintenance Engineers

EMA employs seven engineers, aside from production staff, to maintain the radio and TV equipment. Taking the scale of procured equipment into consideration, the maintenance work can be handled by above mentioned three program production engineers at each studio without hiring additional staff.

2-4-2 Education and Training

Education and training of radio/TV producers and newly hired production engineers, as well as retraining of production engineers, should preferably be conducted at EMA as in the past.

Radio/TV production training is given almost annually to the staff of Regional Education Bureaus by the staff and retirees of EMA.

Number of trainees and the contents of past training programs (1996 - 2000) are described below:

(1) Radio Producer Training (6 weeks): 194 persons

Education of radio producers (staff of Regional Education Bureaus and elementary/secondary school teachers)

(2) TV Producer Training (6 weeks): 31 persons

Education of TV producers (EMA staff and secondary school teachers)

(3) Radio Engineering Training: 111 persons

- Operation/maintenance techniques of radio studio equipment
- Operation/maintenance techniques of radio transmission equipment
- Program editing techniques

(4) Distance Education Training: 92 persons

Training of those with teaching license at the secondary school level for Out of Youth School programs

- Teaching course
- Textbook preparation course
- Textbook editing course

(5) Media Management Training: 115 persons

Training of executive staff of Regional Education Bureaus and teachers about the usage of radio and TV media.

Numbers of trainee of program production training during the past two years and for this fiscal year are as follows:

1999/2000

Distance education (textbook preparation) course	54	(Financial assistance by UNDP)
Media management training	32	(Financial assistance by UNICEF)
Radio engineering training	21	(Financial assistance by UNICEF)

2000/2001

Training on usage of English IRI programs	46	(Financial assistance by USAID)
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2001/2002

Radio producer training	30	(Financial assistance by UNICEF)
Radio engineering training	15	(Financial assistance by UNICEF)

UNICEF, USAID, UNDP, and other donor organizations are actively involved in extending financial assistance to these training programs. To ensure their continuance, the Ministry of Education and EMA need to keep appealing to these organizations.

Engineering training programs listed above still deal with old (analog) technology partly because EMA engineers have not been familiar with new (digital) technology on the operation/maintenance level.

Therefore, for the operation and maintenance of digital equipment, it will be important that experts are dispatched through a technical assistance scheme to carry out the following:

- (a) Training of production and maintenance engineers of EMA
- (b) Establishment of a new training course (digital technology)

2-4-3 Maintenance System

EMA's engineering staff have been accumulating various techniques and skills for 35 years since its establishment in 1965. They have the capability and know-how to handle a variety of situations concerning the operation and maintenance of analog equipment.

In addition, through communication with the engineers of ETV and Radio Stations, EMA studio engineers are acquiring a wide knowledge of the latest technologies and trends.

Periodic maintenance works of EMA are done in the manner described below:

(1) Preventive maintenance:

[Every Day]

Cleaning, check of power supply and visual inspection of equipment

[Once a Week]

Oiling of equipment, demagnetization of magnetic heads of recording equipment (tape recorders, cassette tape recorders, VTRs)

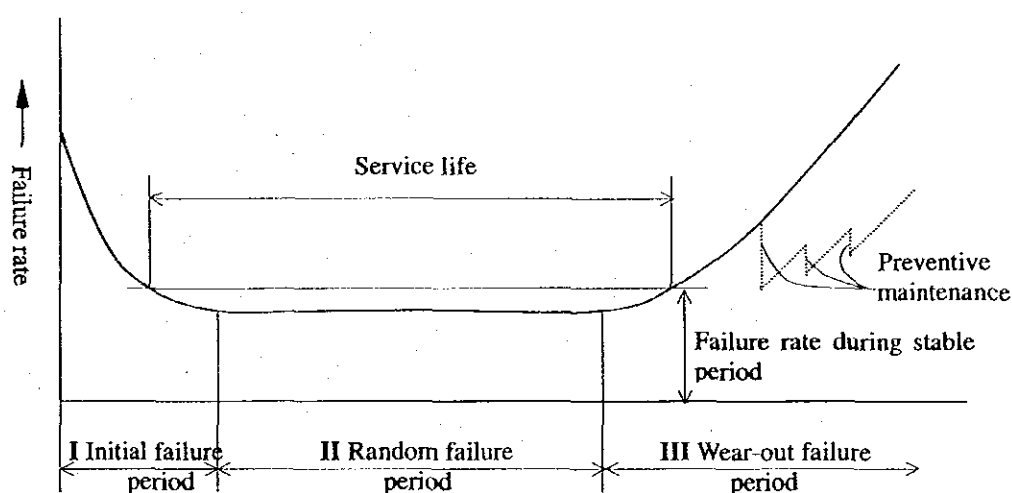
(2) Repair: Broken equipment is brought into the maintenance room for repair by replacing spare modules and parts.

Records of operation and maintenance works are well kept. Monthly reports on the operation status of each instrument and maintenance work schedule are prepared and submitted to the Ministry of Education.

These steady efforts are the major factor in the sustenance of existing equipment and continuance of production activities despite the shortage or absence of spare parts.

Each regional studio should also adopt the maintenance system of EMA.

For reference, changes in failure rate of production equipment in relation to passage of time is shown below:



I Initial Failure Period

Breakage occurring during this period originates in a defective lot or other initial defects. It is important to identify the cause and find solutions promptly.

II Random Failure Period

When the initial failures are resolved, the failure rate stays at a low stable level until the beginning of the wear-out period. The service life of a machine is said to be the period from the time at which the failure rate drops below that provided for the equipment during the initial period and to the time at which the failure rate rises to that level again during the wear-out period.

III Wear-Out Failure Period

Failure rate increases again after the random failure period. Failures during this period occur due to wear and tear of parts used in the equipment, which can be prevented while prolonging the service life of the machine by practicing proper preventive maintenance.

Although failure rate during the random failure period, which occupies most of service life, is relatively low at a stable level, a large variety of troubles occur at random. These troubles are most often caused by stresses created by improper operation or operating environment (temperature, humidity, etc).

2-4-4 Operation/Maintenance Costs after the Implementation of the Project

Itemized below are operation/maintenance costs to be incurred after the implementation of this project.

(1) Operation/Maintenance Costs

1) Cost for hiring 3 new engineering staff members

- A diploma engineer (with 4 years of experience after graduating from vocational school)

$$835 \text{ Birr/month} \times 12 \text{ months} = 10,020 \text{ Birr/year}$$

- New employees (new graduates from vocational school)

$$600 \text{ Birr/month} \times 12 \text{ months} \times 2 \text{ persons} = 14,400 \text{ Birr/year}$$

Total (for 3 recruits): 24,420 Birr/year

2) Production Cost

(a) Production cost at EMA

a) Radio programs

Based on the past figures, producing one program costs 400 Birr on the average. Thus, making 20 programs for one subject will cost:

$$400 \text{ Birr} \times 20 \text{ programs} = \boxed{8,000 \text{ Birr/subject}}$$

b) TV programs

Referring to the figures of the previous year, cost of producing 20 TV programs for one subject will be:

$$\boxed{20,000 \text{ Birr/subject}}$$

(b) Production cost at Regional Education Bureaus

Cost for producing programs for each subject is as follows:

- Script writing fees (In case school principals, etc are hired):

$$5,600 \text{ Birr/subject (28 programs per subject)}$$

- Performance fees:

$$\text{Teacher: } 146 \text{ Birr/subject}$$

$$\text{Students: } 50 \text{ Birr (10 Birr/subject} \times 5 \text{ persons on the average)}$$

$$\boxed{\text{Total: } 5,796 \text{ Birr/subject}}$$

Programs for the general public to be produced at Addis Ababa

- Script writing: to be done by the regional education bureau staff

- Performance fees

$$\text{Teacher: } 37.5 \text{ Birr}$$

$$\text{Other performers (3 persons): } 36.6 \text{ Birr}$$

$$(37.5 \text{ Birr} + 36.6 \text{ Birr}) \times 226 \text{ programs} = 16,746 \text{ Birr}$$

$$\boxed{\text{Total: } 16,746 \text{ Birr}}$$

Programs for the general public to be produced at Harar

- Script writing: to be done by the Regional Education Bureau staff

- Performance fees

$$\text{Teacher: } 37.5 \text{ Birr}$$

$$\text{Other performers (3 persons): } 36.6 \text{ Birr}$$

$$(37.5 \text{ Birr} + 36.6 \text{ Birr}) \times 78 \text{ programs} = 5,780 \text{ Birr}$$

$$\boxed{\text{Total: } 5,780 \text{ Birr}}$$

3) Electricity Charges

(a) EMA

Basic charge: 0.45 Birr/kW

[Radio production]

Operation hours/month:	Production	150 hours
	Editing	120 hours
	Duplication	80 hours
	Maintenance	20 hours
	<hr/>	
	Total	370 hours/month (estimate)

Estimated power consumption/hour: 10kW

370 hours/month × 10kW = 3,700kW/month

0.45 Birr/kW × 3,700kW/month = 1,665 Birr/month

1,665 Birr × 12 months = 19,980 Birr/year

[TV production]

Operation hours/month:	Production	150 hours
	Editing	150 hours
	Duplication	60 hours
	Maintenance	80 hours
	<hr/>	
	Total	440 hours/month (estimate)

Estimated power consumption/hour: 20kW

440 hours/month × 20kW = 8,800kW/month

0.45 Birr/kW × 8,800kW/month = 3,960 Birr/month

3,960 Birr × 12 months = 47,520 Birr/year

(b) Regional Education Bureaus

Basic charge: 0.45 Birr/kW

Operation hours/month:	Production	100 hours/month
	Editing	80 hours
	Duplication	50 hours
	Maintenance	15 hours
	<hr/>	
	Total	245 hours/month (estimate)

Estimated power consumption/hour: 10kW

$$245 \text{ hours/month} \times 10\text{kW} = 2,450\text{kW/month}$$

$$0.45 \text{ Birr/kW} \times 2,450\text{kW/month} = 1,102.5 \text{ Birr/month}$$

$$1,102.5\text{Birr} \times 12 \text{ months} = \boxed{13,230 \text{ Birr/year}}$$

4) Maintenance Cost

Equipment to be procured under this project uses solid state devices which, unlike vacuum tubes, do not require periodic replacement.

However, VTR heads and rotating parts of CD players and other parts that wear over time need to be replaced from time to time. Lamps, fuses, CDs, videotapes, and other expendable items also need occasional replenishment. As the recording medium is changed from tapes to CDs, the purchase cost of recording media will be reduced to about one third.

Since breakage will occur in daily operations, appropriations need to be made for maintenance and servicing.

Japanese broadcasting companies usually set aside 1% of the cost of equipment that they own as an annual maintenance cost. However, this amount is what is needed to broadcast programs on a 24 hours/day basis. Production companies, which do not broadcast live programs, usually appropriate 0.5% of the equipment cost.

Thus, EMA and the Regional Education Bureaus presumably need to allow 0.5% of the cost of equipment to be procured under this project for maintenance.

2-4-5 Operation/Maintenance Costs at each Studio

Operation and Maintenance cost after the project at each studio is examined as follows;

(1) EMA

1) Radio Program Production Cost

Secondary school:	120 programs × 400 Birr =	48,000 Birr
Teachers:	75 programs × 400 Birr =	30,000 Birr
Distance education:	91 programs × 400 Birr =	36,400 Birr
General public education:	156 programs × 400 Birr =	62,400 Birr
Total:		176,800 Birr/year

All IRI programs and diploma teacher training programs are produced through the financial assistance from donor organizations.

2) TV Program Production Cost

Programs produced for secondary schools annually:

5 subjects × 1 grade = 5 subjects/year

Production cost:	20,000 Birr × 5 subjects =	100,000 Birr
Teachers' program:	20,000 Birr × 1 subject =	20,000 Birr
<hr/>		
Total:		120,000 Birr/year

3) Electricity charge: 67,500 Birr/year

4) Maintenance cost: 66,000 Birr/year

Grand Total : 430,300 Birr/year

(2) Gambella Studio

1) Production cost

Programs produced annually: 6 subjects × 2 grades = 12 subjects/year

Production cost: 5,796 Birr × 12 subjects = 69,552 Birr/year

2) Electricity charge: 13,230 Birr/year

3) Cost of CDs: 40 Birr × 84 CDs × 3 = 10,080 Birr/year

4) Maintenance cost: 6,600 Birr/year

Grand Total : 99,462 Birr/year

(3) Harar Studio

1) Production cost

Programs produced annually: 3 subjects × 2 grades = 6 subjects/year

Production cost: 5,796 Birr/subject × 6 subjects = 34,776 Birr/year

Production cost of general public programs: 5,780 Birr/year

2) Electricity charge: 13,230 Birr/year

3) Cost of CDs: 40 Birr × 62 CDs × 3 = 7,440 Birr/year

4) Maintenance cost : 6,600 Birr/year

Grand Total : 67,826 Birr/year

(4) Semera Studio

1) Personnel cost of newly-hired engineers staff:	24,420 Birr/year
2) Production cost	
Programs produced annually:	5 subjects × 2 grades = 10 subjects/year
Production cost:	5,796 Birr × 10 subjects = 57,960 Birr/year
3) Electricity charge:	13,230 Birr/year
4) Cost of CDs:	40 Birr × 60 CDs × 3 = 7,200 Birr/year
5) Maintenance cost:	6,600 Birr/year
<hr/>	
Grand Total :	84,990 Birr/year

(5) Addis Ababa Studio

1) Production cost	
Programs produced annually:	4 subjects × 2 grades = 8 subjects/year
Production cost:	5,796 Birr × 8 subjects = 46,368 Birr/year
Production cost of general public programs:	16,746 Birr/year
2) Electricity charge:	13,230 Birr/year
3) Cost of CDs:	40 Birr × 113 CDs × 3 = 13,560 Birr/year
4) Maintenance cost:	6,600 Birr/year
<hr/>	
Grand Total :	96,504 Birr/year

(6) Dire Dawa Studio

1) Production cost	
Programs produced annually:	6 subjects × 2 grades = 12 subjects/year
Production cost:	5,796 Birr × 12 subjects = 69,552 Birr/year
2) Electricity charge:	13,230 Birr/year
3) Cost of CDs:	40 Birr × 84 CDs × 3 = 10,080 Birr/year
4) Maintenance cost:	6,600 Birr/year
<hr/>	
Grand Total :	99,462 Birr/year

(7) Mizan Teferi Studio

1) Personnel cost for newly-hired engineers:	24,400 Birr/year
2) Production cost	
Programs produced annually:	3 subjects × 4 languages × 1 grade = 12 subjects/year
Production cost:	5,796 Birr × 12 subjects = 69,552 Birr/year
3) Electricity charge:	13,230 Birr/year

4) Cost of CDs: $40 \text{ Birr} \times 84 \text{ CDs} \times 3 =$	10,080 Birr/year
5) Maintenance cost:	6,600 Birr/year
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Grand Total :	123,862 Birr/year

(8) Alemaya Studio

1) Personnel cost for newly-hired engineers:	24,400 Birr/year
2) Production cost	
Programs produced annually: $6 \text{ subjects} \times 2 \text{ grades} = 12 \text{ subjects/year}$	
Production cost: $5,796 \text{ Birr} \times 12 \text{ subjects} =$	69,552 Birr/year
3) Electricity charge:	13,230 Birr/year
4) Cost of CDs: $40 \text{ Birr} \times 84 \text{ CDs} =$	10,080 Birr/year
5) Maintenance cost:	6,600 Birr/year
<hr/>	
Grand Total :	123,862 Birr/year

(9) Mekelle Studio

1) Personnel cost of newly-hired engineers:	24,400 Birr/year
2) Production cost	
Script writing:	5,600 Birr/subject
Performance fees:	
teacher:	146 Birr/subject
student:	50 Birr
	(10 Birr/subject \times 5 performers on average)
Videotapes: $110 \text{ Birr} \times 20 \text{ rolls/subject} =$	2,200 Birr/subject
Total Production cost:	7,996 Birr/year
3) Electricity charge	
At the usage rate of 50 hours per month:	
$50 \text{ hours} \times 2 \text{ kW} = 100 \text{ kW/month}$	
$0.45 \text{ Birr/kW} \times 100 \text{ kW/month} \times 12 \text{ months} =$	540 Birr/year
4) Maintenance cost:	8,300 Birr/year
<hr/>	
Grand Total :	41,236 Birr/year