

**BASIC DESIGN STUDY REPORT
ON
THE PROJECT
FOR
IMPROVEMENT OF BROADCASTING FACILITIES
FOR
THE TVRI MAKASSAR STATION
IN
THE REPUBLIC OF INDONESIA**

AUGUST 2003

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
YACHIYO ENGINEERING CO., LTD.**

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PREFACE

In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct a Basic Design Study on the Project for Improvement of Broadcasting Facilities for the TVRI Makassar Station in the Republic of Indonesia and entrusted the study to the Japan International Cooperation Agency (JICA).

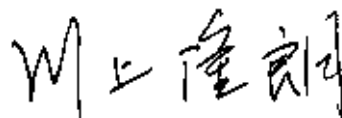
JICA sent to Indonesia a study team from March 30 to May 4, 2003.

The team held discussions with the officials concerned of the Government of Indonesia, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Indonesia in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the teams.

August, 2003



Takao Kawakami

President

Japan International Cooperation Agency

LETTER OF TRANSMITTAL

August, 2003

We are pleased to submit to you the Basic Design Study Report on the Project for Improvement of Broadcasting Facilities for the TVRI Makassar Station in the Republic of Indonesia.

This study was conducted by Yachiyo Engineering Co., Ltd., under a contract to JICA, during the period from March, 2003 to August, 2003. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Indonesia and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

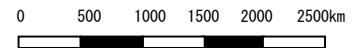
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

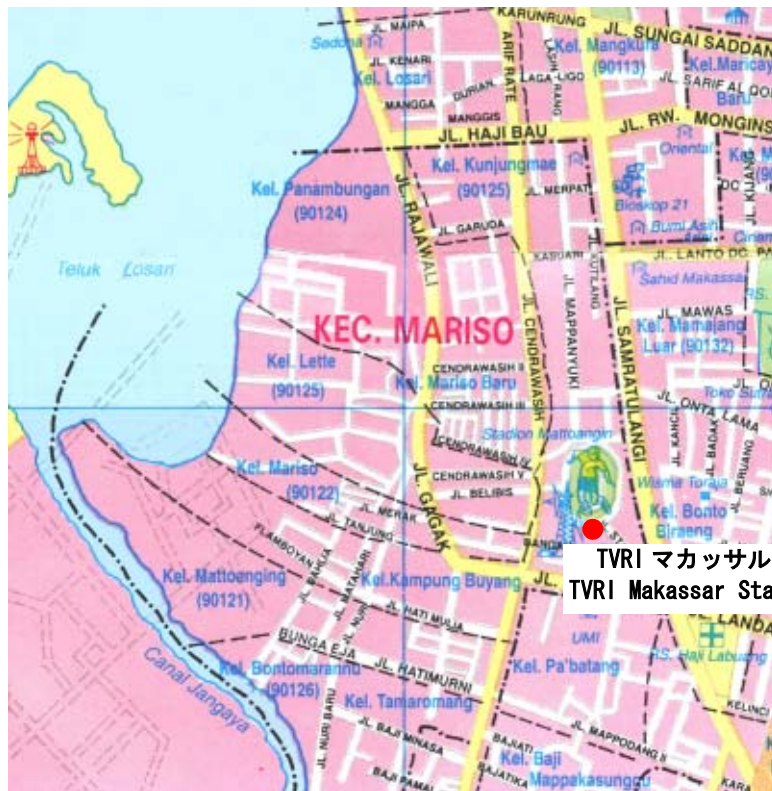
上田正明

Masaaki Ueda
Project Manager,
Basic Design Study Team on the
Project for Improvement of
Broadcasting Facilities for the TVRI
Makassar Station in the Republic of
Indonesia

Yachiyo Engineering Co., Ltd.



インドネシア共和国位置図
THE REPUBLIC OF INDONESIA



TVRI マカッサル局
TVRI Makassar Station

本計画対象地位置図
Location Map of Project Site

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ABBREVIATIONS

A E S	Audio Engineering Society
C C I R	Comité Consultatif International des Radio-Communications
C D	Compact Disk
D A T	Digital Audio Tape
E / N	Exchange of Notes
E N G	Electric News Gathering
F P U	Field Pick-up Unit
I E C	International Electrotechnical Commission
I S O	International Organization for Standards
I T U	International Telecommunication Union
J C S	Japanese Electrical Wire and Cable Maker's Association Standards
J E A C	Japan Electric Association Code
J E C	Japanese Electrotechnical Committee
J E M	Standards of Japan Electrical Manufacturer's Association
J I C A	Japan International Cooperation Agency
J I S	Japanese Industrial Standards
N T S C	National Television System Committee
O J T	On the Job Training
P A L	Phase Alternative Line
R R I	Radio of the Republic of Indonesia
S M P T E	Society of Motion Picture and Television Engineers
T V R I	Television of the Republic of Indonesia

SUMMARY

SUMMARY

The Republic of Indonesia (hereinafter referred to as “Indonesia”) is an island country consisting of some 15,000 islands with a total population of approximately 200 million. She has diverse social and cultural backgrounds, illustrated by some 300 ethnic groups and 250 local languages.

The Government of Indonesia considers the promotion of ethnic integration through smooth communications between people while respecting the social and cultural backgrounds and originality of ethnic groups to be the most important issue for the socioeconomic development of Indonesia’s multi-racial and multi-cultural society.

As “information sharing” is an important element of the pursuit and preservation of ethnic integration and national solidarity, such mass-media are essential because television and radio are capable of transmitting a large volume of information at a time are essential. These media are particularly effective for a country such as Indonesia where a large number of people are scattered over a huge territory.

Based on such understanding, the Government of Indonesia, which aims at establishing democratic social and economic systems, upholds the sound development of mass-media as one of its national goals. In its current national development plan (PROPENAS 2000–2004), the Government of Indonesia compiles the guidelines for the development of the environment for information and communication media, actively promoting the necessary policies to ensure the freedom of the press, to establish press ethics and to achieve equal opportunity of access to information.

Meanwhile, the roles of the mass-media as demanded by the public have been changing. In addition to the production of programmes with a wide public appeal through the extensive use of ever-changing technology and know-how, the swift and accurate conveyance of various information on the changing world to the public is required.

Amidst the process of profound changes of the mass-media in Indonesia, PT. Televisi Republik Indonesia (TVRI) has the obligation to provide impartial broadcasting nationwide as the sole public television broadcasting body under the new Broadcasting Act introduced in November, 2002. Moreover, its status was changed from “Perjan” (corporation) to “Persero” (state enterprise) on 15th April, 2003 following the policy of promoting PT (state enterprises) as part of the government’s drive for the structural reform of the country’s economy and finance. Even before this change, the TVRI was facing financial difficulties because of the

declining subsidy from the central government and the latest change has made its own operational fund by self-help and the rationalisation of business management.

Since the Sixth Five Year Plan (1994–1998), the Government of Indonesia has identified eastern Indonesia, i.e. Kalimantan and eastwards, which is experiencing a great economic gap compared to Java Island and which is a priority area for development, and has been actively trying to rectify the poverty gap between these regions. The TVRI Makassar Station is located in the City of Makassar in south Sulawesi, which is the central area of the said eastern Indonesia. As the provincial capital of south Sulawesi, Makassar is the central area for industrial and economic activities in eastern Indonesia. As the sole institution producing and broadcasting television programmes in this area, the TVRI Makassar Station plays an important role of transmitting the culture, traditions and events of eastern Indonesia locally as well as nationally.

Despite such importance, the news gathering and programme-making functions of this third oldest local TV station (opened in 1974), the equipment and facilities of which have largely been developed with Japanese assistance (loans), in Indonesia have been experiencing problems due to the aging and breakdown of equipment. For example, morning programmes (05:00 - 07:00) have been suspended since 2001.

Recognising the fact that further programme-making using the existing old equipment is practically impossible, the Government of Indonesia made a request to the Government of Japan for grant aid to renew the range of broadcasting facilities. In response to this request, the Government of Japan decided to conduct a basic design study and, under the instruction of the government, the Japan International Cooperation Agency (JICA) dispatched the Basic Design Study Team to Indonesia for the period from 30th March to 4th May, 2003. In Indonesia, the Study Team discussed the contents of the request with related persons of the Government of Indonesia and the TVRI, conducted a survey at the project site and gathered related reference materials. While taking the contents of the request into consideration, the Study Team examined the optimal range, scale and quantity of equipment from various viewpoints, including the equipment operation and maintenance capability of the TVRI Makassar Station, and the optimal equipment layout and compiled the Draft Basic Design. Following the compilation of the Draft Basic Design, the JICA dispatched a mission to Indonesia for the period from 6th to 16th July, 2003 to explain and discuss the contents of this Draft Basic Design.

The scope of the Project includes the minimum range of facilities required for news gathering outside the station in addition to the minimum range of facilities required by a TV

broadcasting station to produce programmes in the studio. The finally proposed contents of the basic design are outlined below.

- One set of equipment for Studio No. 2
- One set of equipment for the Continuity Room (PC)
- One set of editing equipment for programme-making
- One set of equipment to make news programmes
- One set of field pick up unit (FPU)
- One set of measurement tools, etc.,

The Project is expected to require some 15 months to complete at an estimated cost of approximately ¥475 million (¥459 million to be borne by the Japanese side and ¥16 million to be borne by the Indonesian side).

With the implementation of the Project, the old-fashioned and aged analogue equipment at the TVRI Makassar Station will be replaced by more advanced digital equipment to bring about (i) a major improvement of the contents of programmes produced by the station and (ii) an extension of the broadcasting hours. As a result, the number of people viewing local programmes produced by the TVRI Makassar Station will greatly increase, making a major contribution to socioeconomic improvement in eastern Indonesia. Moreover, the Project is in line with the principal goal of Indonesia's national development plan, i.e. "the impartial and accurate dissemination of information" to all people in Indonesia. No technical problems relating to equipment maintenance are anticipated as the careful and reliable operation and maintenance of the analogue equipment supplied in the past by staff of the TVRI Makassar Station have been verified. There is a reasonable prospect of securing the necessary maintenance budget.

Having analysed the project effects and the organizational capacity of the recipient side, etc., in a comprehensive manner, the implementation of the Project under the grant aid scheme of the Government of Japan is judged to be a significant.

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Chapter 1

Background of the Project

CHAPTER 1 BACKGROUND OF THE PROJECT

1-1 Outline of the Request

The contents of the request made by the Government of Indonesia is as follows.

List of Equipment Requested in the Proposal

No.	Equipment	Q' ty
1	Studio No.1 System	
(1)	Studio No.1 System	1 set
1)	Digital Camera System	1 set
-1	CCD Camera Studio Type (FIT/20x Zoom Lens/7"BF)	3 sets
-2	Pedestal	3 sets
-3	Camera Control Unit	3 sets
-4	Master Setup Unit	1 set
2)	Video System Equipment	1 set
-1	Digital Production Switcher	1 set
-2	Digital Video Effect	2 sets
-3	Digital VCR (PB / REC) with Parallel Remote	2 sets
-4	Digital VCR(PB) / with Parallel Remote	1 set
-5	Frame Synchronizer	3 sets
-6	Analog to Digital Video Converter	1 lot
-7	Digital to Analog Video Converter	1 lot
-8	Computer Graphics	1 set
-9	VDA, VJ, Rack, Console	1 lot
-10	Video Routing Switcher	1 set
3)	Digital Audio System Equipment	1 set
-1	Audio Mixer	1 set
-2	Digital Audio Tape Recorder	2 sets
-3	Compact Disk Player	2 sets
-4	Audio Cassette Recorder	1 set
-5	Mini Disk Player	1 set
-6	Audio Effector	2 sets
-7	Audio Delay	3 sets
-8	Talkback System	1 lot
-9	Audio Distributor	1 lot
-10	Microphone	
	A. Dynamic Microphone	6 sets
	B. Condenser Microphone	3 sets
	C. Wireless Microphone (Hand Type)	3 sets
-11	Microphone Stand	1 lot
-12	AJ, Console, Rack, Announce Booth Equipment	1 lot
4)	Monitoring System Equipment	1 set
-1	Video Monitor	1 lot
-2	Studio Floor Monitor (with OA Light and Tally)	1 lot
-3	Waveform Monitor Analog and Digital	1 lot
-4	Vector Scope	1 set
-5	Audio Monitor	1 lot
-6	Studio Audio Monitor	1 lot
-7	Monitor Shelf	1 set
-8	Master Monitor	1 lot
5)	Sync Signal Equipment	1 set
-1	Sync Signal Generator (1)	2 sets
-2	Sync Signal Generator (2)	1 set
-3	Audio Change-over Unit	1 set

No.	Equipment	Q' ty
-4	Video Distribution Amplifier / Pulse Distribution Amplifier	1 lot
6)	Intercom System	1 set
-1	Studio Intercommunication System	1 lot
-2	Room to Room Communication System (10 terminals)	1 lot
-3	Telephone Hybrid	2 sets
7)	Tally System and On-Air Light	1 set
-1	OA Tally Logic	1 set
-2	OA Tally Light for Monitor	1 set
-3	OA Tally Light for Floor	1 set
8)	Clock	1 set
-1	Master Clock with GPS	1 set
-2	Slave Clock	1 lot
A9)	Installation Materials	1 lot
(2)	Sending VCR	1 set
1)	Digital VCR(PB with Parallel Remote) for Studio 1	4 sets
(3)	1 To 1 Editing System	5 sets
1)	Digital VCR(PB / REC)	2 sets
2)	Editing Controller	1 set
3)	Video Monitor	2 sets
4)	Installation Materials	1 lot
(4)	A/B Roll Editing System	2 sets
1)	Digital Video Switcher	1 set
2)	Digital Video Effects	1 set
3)	Editing Controller	1 set
4)	Character Generator	1 set
5)	Digital VCR (PB/REC)	2 sets
6)	Digital VCR (PB)	1 set
7)	Sync Signal Generator	1 set
8)	Video Monitor	1 lot
9)	Waveform Monitor	1 set
10)	Vector Scope	1 set
11)	Digital Audio Mixer	1 set
12)	Digital Audio Effector	1 set
13)	Audio Monitor	1 lot
14)	Digital Audio Tape Recorder	1 set
15)	Compact Disk Recorder	1 set
16)	Audio Cassette Recorder	1 set
17)	Mini Disk Player	1 set
18)	VJ, AJ, Rack, Console	1 lot
(5)	Measuring Equipment	1 set
1)	Analog Oscilloscope (400MHz)	2 sets
2)	Video Analyzer	1 set
3)	Video Signal Generator	1 set
4)	Analog Audio Analyzer	2 sets
(6)	Major Spare Parts	1 set
1)	CCD Camera (Studio Type)	1 set
-1	Complete Board Set	1 set
-2	Power Supply Unit for CCU	1 set
-3	Lens Kit	1 set
-4	Tool Kit	2 sets
-5	Triax Cable (100m)	1 set
-6	Triax Cable (50m)	1 set
2)	CCD Camera (ENG/EFP Type)	1 set
-1	Complete Board Set	1 set
-2	Power Supply Unit for CCU	1 set
-3	Lens Kit	1 set
-4	Tool Kit	2 sets
3)	Video Switcher	1 lot
-1	Complete Board Set for Switcher	1 lot

No.	Equipment	Q' ty
-2	Complete Board Set for ENG Switcher	1 lot
-3	Complete Board Set for DVE	1 set
-4	Power Supply Unit	2 sets
-5	Lamp (LED)	1 lot
4)	Computer Graphics	1 set
-1	Application Software	1 lot
5)	Video Monitor	1 set
-1	Complete Set	8 sets
-2	Each Spare Board	1 lot
6)	Audio Mixer	1 set
-1	Input Modules	3 sets
-2	Output Modules	2 sets
7)	Digital VCR	1 set
-1	Each Spare Board	1 lot
-2	Video Head Assay (PB)	12 sets
-3	Video Head Assay (PB/REC)	12 sets
-4	Pinch Roller	25 sets
-5	Tape Cleaner	2 sets
-6	Control Panel	1 set
-7	Tool Kit	2 sets
-8	Mechanical Parts	1 lot
8)	Speaker	1 set
-1	Audio Console Speaker	2 sets
-2	Ceiling Speaker	2 sets
9)	Tape	1 set
-1	Digital Video Tape (90 minutes)	100 pcs
-2	Digital Audio Tape (90 minutes)	100 pcs
10)	Video Equipment	1 set
-1	A/D Converter	5 sets
-2	D/A Converter	5 sets
-3	DDA Unit	5 sets
-4	VDA Unit	5 sets
11)	Others	1 set
-1	Slave Clock	2 sets
-2	Room to Room Intercom Terminal	2 sets
-3	Intercom Box for Studio	2 sets
(7)	Lighting Equipment for Studio-1	1 set
1)	500W Top Cyclorama Light	18 pcs
2)	1kW Flood Light	8 pcs
3)	650W Fresnel Lens Spotlight	16 pcs
4)	Clamp Hanger	24 pcs
5)	2m Extension Cable	10 pcs
6)	5m Extension Cable	10 pcs
7)	Operation Bar	2 pcs
8)	240V 500W Halogen Lamp for UHQ10IIICA	54 pcs
9)	240V 500W Halogen Lamp for LQB	48 pcs
10)	240V 650W Halogen Lamp for 0.5KOSIIIA	48 pcs
11)	8-Circuits Dimmer and Control Panel	1 set
2.	News Production System	
(1)	1 To 1 Editing System	3 sets
1)	Digital VCR (PB/REC)	2 sets
2)	Editing Controller	1 set
3)	Video Monitor	2 sets
4)	Installation Materials	1 lot
(2)	A/B Roll Editing System	1 set
1)	Digital Video Switcher	1 set
2)	Digital Video Effects	1 set
3)	Editing Controller	1 set
4)	Character Generator	1 set

No.	Equipment	Q' ty
5)	Digital VCR (PB/REC)	2 sets
6)	Digital VCR (PB)	1 set
7)	Sync Signal Generator	1 set
8)	Video Monitor	1 lot
9)	Waveform Monitor	1 set
10)	Vector Scope	1 set
11)	Digital Audio Mixer	1 set
12)	Digital Audio Effector	1 set
13)	Audio Monitor	1 lot
14)	Digital Audio Tape Recorder	1 set
15)	Compact Disk Recorder	1 set
16)	Audio Cassette Recorder	1 set
17)	Mini Disk Player	1 set
18)	VJ, AJ, Rack, Console	1 lot
(3)	Non Linier Editing Audio Video Workstation	1 set
1)	Non Linier Editing Audio Video Workstation	1 set
(4)	One Piece ENG Camera Recorder Type	3 sets
1)	Camera Head	1 set
2)	Shoulder Strap	1 set
3)	Viewfinder 1.5"	1 set
4)	Mount Plate	1 set
5)	Gun Microphone	1 set
6)	Zoom Lens	1 set
7)	Camera Lighting	1 set
8)	Tripod + Spreader	1 set
9)	Battery Package (1pc of Battery Charger + 3pcs of Battery Pack)	1 lot
10)	Battery Pack	2 pcs
11)	AC Adaptor	1 set
12)	Carrying Case	1 set
13)	Instruction and Manual Book	1 set
(5)	ENG/EFP Camera	2 sets
1)	Camera Head	1 set
2)	Shoulder Strap	1 set
3)	Viewfinder 1.5"	1 set
4)	Gun Microphone	1 set
5)	Sun Hood	1 set
6)	Rain Cover	1 set
7)	Headset Single Muff	1 set
8)	Zoom Lens (20 times)	1 set
9)	Dockable Video Recorder	1 set
10)	Dockable VCR Adaptor	1 set
11)	Battery Charger for 4XNP-1	1 set
12)	Battery Pack	2 pcs
13)	Tungsten Powered Reporter Light	1 set
14)	Transport Case	1 set
15)	Instruction and Manual Book	1 set
(6)	EFP Accessories	1 set
1)	Triax Adaptor	2 sets
2)	Headset Double Muff	4 pcs
3)	Triax Cable 100 meter + Drum)	2 sets
4)	Viewfinder 5" + Mounting	2 sets
5)	Triax Base Station	2 sets
6)	Operation Control Panel + Cables	2 sets
7)	Remote Kit Lens	2 sets
8)	Tripod + Spreader + Dolly + Stick (2pcs)	2 sets
3.	Installation	1 lot

Chapter 2

Concept of the Project

CHAPTER 2 CONTENTS OF THE PROJECT

2-1 Basic Concept of the Project

2-1-1 Overall Goal and Project Purpose

It is the most important for socioeconomic development of Indonesia to keep good communications among the people, respect the peoples' socio-cultural backgrounds and uniqueness, and promote harmony, and thus maintain the unity of the nation.

Sharing information is very important to keep the national harmony and unity, and mass media like television and radio that can disseminate a large quantity of information at once is indispensable. It is particularly effective in Indonesia where many people scatter around a vast area of the land.

The Government of Indonesia designates the eastern region as an important area for development and attempts to rectify the poverty gap among the regions after the Sixth Five-Year National Development Plan (1994-1998). The TVRI Makassar Station is located in the heart of the eastern region and the third local station established as an information dissemination center in the nation. In this context, the Project aims at replacing the broadcast equipment so obsolete to adversely affect programme production and maintaining its function.

2-1-2 Outline of the Project

The Project plans the procurement and installation of a number of equipment which is essential to produce TV programmes in a studio and a sub-control room, news programme production equipment, etc., at the TVRI Makassar Station to achieve the objectives described above. This further leads the reliability of new equipment is expected to continue the present programmes on air and to revive morning programmes which is suspended from 2001.

The Project also brings about an increase in the number of its own broadcasting programmes and an improvement of the quality of the programmes by the digital equipment available, to be reduce programme production and editing time in the TVRI Makassar Station.

2-2 Basic Design of Requested Japanese Assistance

2-2-1 Design Policy

(1) Basic Policies

The equipment plan shall be most suitable for TV broadcasting by taking into account the role and function of the TVRI Makassar Station. The basic policies are described below.

- 1) Design the best mix of equipment that produces the maximum effect with the existing analogue and new digital equipment as one system.
- 2) Construct a rational system to produce the maximum effect with minimum input by examining in detail the purpose and level of local programmes.
- 3) Adopt the existing broadcasting system CCIR-B (PAL-B) as unchanged.

(2) Natural Conditions

1) Temperature

The city of Makassar is situated in a tropical monsoon zone in terms of climate. The annual maximum and minimum temperatures are approximately 33°C and 22°C respectively. The mean annual temperature is approximately 27.5°C (in 2000). The mean monthly relative humidity varies from 71% to 87% (in 2000), making the installation of air-conditioning essential to prevent condensation in addition to cooling the heat generated by equipment. Special measures relating to temperature and relative humidity are also required for outdoor equipment.

2) Rainfall

Makassar has a dry season from May to October with mean monthly rainfall of less than 180mm and a rainy season from November to April with mean monthly rainfall of more than 300mm. During the rainy season, a high rainfall level of some 1,000mm is recorded in February in particular. While no special consideration is necessary in relation to rainfall for the implementation of the Project, anti-condensation and other measures are necessary.

3) Earthquakes

No earthquake data is available for Makassar. Statistical records published in Indonesia (Statistik Lingkungan Hidup Indonesia: 2001) mention an earthquake with a magnitude of 5.2 (seismic centre: 12 km below ground) in November, 2001 at Paso to the north of Makassar. This means that some seismic measures are necessary for the installation of lightning equipment, etc.,

(3) Socioeconomic Conditions

It was decided that the TVRI would be converted from a public corporation (Perjan) into a state-owned company (Persero) in April 2002, and it was officially nationalized on April 15, 2003. Thus, the main financial sources for the TVRI will be shifted to commercial fee from the subsidy from the central government has stopped. The new broadcast law put into effect in November 2002 places an obligation on the TVRI to provide an equitable broadcast throughout the nation as a sole public broadcaster.

Since the TVRI Makassar Station plays an important role as a information dissemination base in the region, it is considered meaningful to renew the broadcast equipment necessary for the Station to produce programmes.

In addition, for the TVRI to compete private broadcasters for the revenue from advertisement and operate on it, the newest digital equipment is necessary.

(4) Local Construction Industry and Prospect of Local Procurement

As much of the main equipment and other items to be procured under the Project are not manufactured in Indonesia, they will be procured in Japan. However, some of the broadcasting equipment will be procured in the US and/or Europe.

(5) Use of Local Companies

There are construction companies and electrical Suppliers in Makassar with experience of local construction work. Accordingly, it is possible to employ or lease workers, transport vehicles and installation machinery, etc., which are required for the implementation of the Project. The installation work for the broadcasting equipment together with the adjustment and testing, etc., of such equipment after installation will, however, require advanced skills

and the dispatch of engineers from Japan to be in charge of quality management, to provide technical instruction and to conduct implementation management will be necessary.

(6) Operation and Maintenance Capability of Implementation Body

Some of the technical staff of the TVRI Makassar Station have undergone training in Japan or other countries in the past and have acquired operating and maintenance skills. As a result, the existing equipment is generally well maintained. However, these engineers are unaccustomed to the operation and maintenance of the latest digital equipment, making the dispatch of Japanese engineers at the time of equipment installation essential to provide technical guidance on operation and maintenance.

(7) Policies Regarding Scope and Grade of Facilities and Equipment

The scope of equipment procurement and the technical standards for the Project are based on the policies and principles described below.

1) Suitable Equipment Grade

There are different categories of broadcasting equipment reflecting the purpose/place of use, i.e. “home/consumer use”, “professional use” or “broadcasting station use”. Equipment for “a broadcasting station use” is quite expensive because of the high design level of reliability and redundancy to ensure its continual operation. There are cases of broadcasting stations using equipment designed for “professional use” because of its auxiliary nature. The grade for the equipment to be provided under the Project will be either “professional use” or “broadcasting station use” taking compatibility with the equipment owned by the TVRI Jakarta Station into consideration. Although equipment for “home/consumer use” is inexpensive, it is not considered an option for any of the main equipment because of its inferior reliability compared to equipment of the other two categories.

2) System Configuration

All of the video and audio systems relating to TV broadcasting will be digital systems to avoid any quality gap between the video and audio systems. Signal exchange between the systems will also use a digital system to conform to the latest international standards, etc., In view of the planned use of some analogue equipment for transmission, the input system to the audio control console will be capable of selecting either analogue

or digital signal input. Special attention will be paid to ensuring a high quality of broadcasting even though a mixed system of analogue and digital signals is used.

3) Standards for Recording Equipment

As far as the size of the broadcasting VTR tape is concerned, equipment using 1inch tape size was developed in the 1970's for use by broadcasting stations. This tape has been used for the recording, editing and transmission of programmes made in the studio or for outside broadcasting. Meanwhile, the development of ENG equipment has progressed to the point of the global use of lightweight portable cameras with a built-in VTR mechanism (ENG cameras). The more recent advancement of digital technology has culminated in the production of 1/2 inches tape format equipment with high definition capability by several Japanese manufacturers. 1/4 inches tape format equipment is also used, mainly for news gathering. Meanwhile, such new recording media as hard discs and optical discs which are used for computing have been developed for commercial use, illustrating the trend of the diversification of the recording medium used by video equipment from conventional tape-recording. Therefore, the system shall be designed not to be disrupted by whichever size of VTR adopted.

i) Compatibility of Tape and Equipment

The TVRI Makassar Station sometimes receives reinforcement in terms of manpower and equipment from the Jakarta Station for outdoor relay broadcasting, including the recording of local events. The effective use of equipment can be achieved and technical operation difficulties faced by technical staff can be prevented by adopting a common tape size and format between the two stations. Compatibility should at least be maintained within the network of the same broadcaster. In addition, the mixed presence of equipment made by many different manufacturers at a single broadcasting station should be avoided to minimise complexity in terms of the procurement and management of spare parts.

ii) Effective Use of Existing Programme Materials

At present, the TVRI Makassar Station has archives of more than 200 recorded tapes of general and news programmes. In view of the plan to focus future local programmes on folk music, folk dancing and local news, etc., centering on Makassar, the active use of these programme materials is important.

iii) Exchange of Programmes

Makassar is a key industrial centre in East Indonesia where socioeconomic development is said to lag behind other regions. The programmes recorded using tape at the Makassar Station are delivered to not only other regional stations of Sulawesi but also to Kalimantan and even Java where the main station is located.

(8) Design Conditions and Standards

For the design of the planned facilities and equipment under the Project, the Japanese standards as well as such international standards as IEC and ISO listed below will be referred to for the main functions and manufacturing standards for the equipment. International Standards (SI) units will be used for the units.

International Electrical Code (IEC)	: applied to the main functions of electrical products in general
International Organization for Standards (ISO)	: applied to the performance evaluation of industrial products in general
Japan Industrial Standards (JIS)	: applied to industrial products in general
Institute of Electrical Engineers of Japan Standards (JEC)	: applied to electrical products in general
Japanese Electrical Manufacturers' Association Standards (JEM)	: as above
Japan Electric Association Code (JEAC)	: as above
Japanese Electrical Wire and Cable Makers' Association Standards (JCS)	: applied to electrical wires and cables
International Radio Consultative Committee (CCIR) Technical Standards	: applied to radio equipment
Electric Industries Association of Japan (EIAJ)	: applied to electronic industrial products in general
International Telecommunications Union (ITU)	: applied to general telecommunications equipment
Technical Standards for Electrical Installations	: applied to electrical installation work in general
Society of Motion Picture and Television Engineers (SMPTE)	: applied to video and audio in general
Digital Sound Interface Standards (AES/EBU)	: applied to broadcasting equipment in general

2-2-2 Basic Plan

(1) Components of Basic Plan

1) Outline

The goal of the Project is for the TVRI Makassar Station to continue producing its own broadcasting programmes and restart the morning programme which has been suspended for now. The system shall be designed to enable the Station to produce programmes efficiently by utilizing the existing equipment as much as possible and combining them with newly procured equipment.

Equipment to be provided under the Project can be integrated to the existing operation system. The equipment shall be also kept at the minimum level required and in case of emergency or large events, it can be supported by the TVRI Jakarta and other Stations.

In view of the contents of the equipment requested by the Indonesian side and the results of the field surveys, the equipment has been selected to put priorities on those required for the Station to maintain the minimum function as a broadcast facility. Other equipment has been selected by putting priorities from the standpoint of cost-effectiveness.

The evaluation criteria for the equipment selection are as follows.

Evaluation Criteria	To be procured in the Project
Equipment is required for operation of broadcast station as minimized operation function	○
Equipment is given high priority through discussion with the Indonesian side.	○
Equipment is probably make good use of alternative one during their idle hours	X

Notes: ○:Passable, X: Impassable

From the list of the requested equipment and evaluation result, the list of equipment procured in the Project are described below. It has been agreed that some portion of the Project shall be implemented by the Indonesian side.

Table 2-2-1 Comparison between Requested Equipment and Project Components

Name		Requested (M/D)	Priorities (*2)	Project Components
Studio No.1 (*1)		○		
		○		
Studio No.2	Studio floor equipment	○	A	●
	Studio sub-control room	○		●
Community Studio (PC room)	News programme production and relay control	○	A	●
	Camera for news studio	○	B	●
Editing room	A/B roll editing system	○	C	
	Non-linear editing system	○	C	
News programme production equipment	1:1 editing system	○	C	●
	ENG camera system	○	B	●
FPU		○	B	●
Measurement tools		○	A	●
Consumables	Tapes	○	A	●

Notes;

*1: It is confirmed in the field survey that the requested equipment for Studio No.1 is mistaken for Studio No.2.

*2: Priority is determined by the Study Team and Indonesian side in the field survey.

○ Requested by the Indonesian side.

● To be planned in the Project

2) Evaluation Results of Broadcasting Equipment

The range of studio equipment of which the procurement under the Project is requested includes existing broadcasting equipment which is expected to break down due to deterioration and the difficulty of obtaining spare parts as described earlier and which require urgent replacement and that which is required for news programmes

While such editing machines as an A/B roll and non-linear editing system are included in the requested equipment, these editing machines are excluded from the Project because it is possible to use replacing equipment in Studio No.2 and the PC (Programme Continuity) Room. In principle, quantity of 1:1 editing system and a one piece ENG camera recorder have been decided to reduce number of equipment from a viewpoint of minimum required equipment .

The study results can be summarized below in view of the requested equipment and existing equipment.

i) Studio No.1 (not included in the Project)

This is excluded from the Project. Studio No.1 of the TVRI Makassar Station has a floor area of some 80m², was originally built in 1974 as part of the Phase 1 Project and is no longer used. As mentioned earlier, the Indonesian side is hoping to use this studio for live broadcasting if possible after the switching over to the new equipment in Studio No.2 under the Project. During this switch-over period, the TV OB-van will be used as a sub-control room.

ii) Studio No.2

The most common method of producing a TV programme in a TV studio is the use of a production switcher in the sub-control room to mix pictures taken from different angles provided by multiple cameras into a single programme. Studio No.2 was built in 1981 as part of the Phase II Project and the video and audio equipment was partly renewed in 1994. However, the lighting equipment, etc., is inefficient in terms of the power consumption and it is believed to be difficult to obtain spare parts for this equipment. This studio is currently used to record entertainment, educational, short plays and other programmes. The request for the renewal of three cameras, the control console and other types of equipment, i.e. the system for Studio No.1 in the request, is judged to be relevant as the production of such programmes requires pictures of performers and teaching aids, etc., involving such camera work as close-ups of the hands and long shots of the performers, etc. All of the equipment is linked as part of the broadcasting system, playing a vital role for programme production, and its effects, including the continuance of educational broadcasting, are quite strong after introduction. Because of such importance, the equipment for Studio No.2 is graded as top priority equipment.

Studio No.2 has a relatively small floor area of approximately 180m². The following light equipment system is adopted for this studio because the recording of music, dancing and special programmes involving several performers is conducted in this studio.

- Manual suspension system: lighting battens for manual adjustment of the height
- Sub-control room: SCR dimmer system, electric plugging rack and lighting control console

Out of the above-listed system and equipment to control lighting from the sub-control room, the existing SCR dimmer system will be kept and the following equipment will be replaced.

- Lighting equipment: spotlights, floodlights, soft lights, upper horizontal lights and lower horizontal lights

The configuration of the lighting system is shown in Fig. 2-2-1.

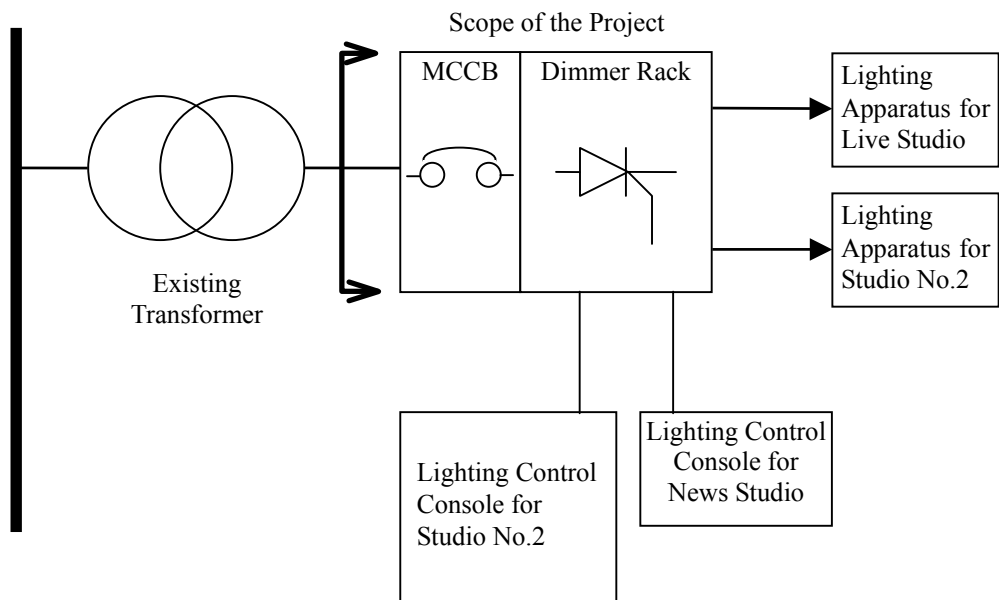


Fig. 2-2-1 Configuration of the Lighting System

iii) Programme Continuity (PC) Room

Most of the equipment in the PC room was installed in 1974, and the control console and most of the other equipment have reached the end of the service life, making replacement necessary. Among the range of requested equipment, four video cassette recorders (VCRs), the routing switcher to transmit programmes and monitors, etc., were found to be essential through discussions with the TVRI side on operation. As these devices and equipment are key components for the operation of a TV broadcasting station, they are classified as top priority equipment.

iv) Digital EFP Camera

An EFP camera is essential for the live news studio attached to the PC room. This live studio is a small studio from which live broadcasting using an EFP camera is possible. Although two cameras are requested as in the case of the present

arrangements according to the Indonesian side, the provision of two cameras are reasonable to be expected for revival of morning programme.

v) Editing/Post Production Equipment

Editing/post production equipment is used to edit recorded programme materials by a VTR to produce an actual programme reflecting the intentions of the director. Such editing units as an A/B roll (one set) and non-linear editing system (one set) are finally excluded from the Project due to the following reasons while these equipments are requested by the Indonesian side.

An A/B roll editing system has highly supplicated functions Even thought, given the fact that the broadcasting of local programmes by the TVRI Makassar Station only lasts for some six hours (after 16:00) a day, it is judged that the equipment of Studio No.2 and the VTRs of the PC room, etc., can be used during the off-broadcasting hours based on the scheduled use of Studio No.2, etc., for recording or live broadcasting. Accordingly, editing/post production equipment is excluded from the Project.

There is one existing unit of non-linear editing system which is not available due to soft wear is out of order in the TVRI Makassar Station. It is anticipated that new non-linear editing system is to be procured will be out of order again if it is not established supporting system for computer . Thus this equipment is excluded from the Project.

Fig. 2-2-2 shows the flow of analogue and digital VTR tapes when the Project is implemented at the TVRI Makassar Station.

vi) News Production Equipment

As briefly mentioned in the previous item “Policies Regarding Scope and Grade of Facilities and Equipment”, the TVRI Jakarta Station has been provided with 19 of the latest ENG cameras under Japan’s grant aid scheme, resulting in the possession of more than 30 ENG cameras. The news department of the TVRI Makassar Station can actively use the existing ENG cameras and can share new production equipment with the TVRI Jakarta Station through the upgrading of skills and improvement of the operation efficiency of the news department of both broadcasting stations in the coming years. Accordingly, minimum required number of new ENG camera is two sets.

It is judged that two sets of 1:1 editing equipment are required for local news production relating to two new ENG, in spite of, three sets are requested by the Indonesian side.

vii) Field Pick-Up Unit (FPU)

An FPU is a device which is used to relay a programme produced in the field using an OB-van to a broadcasting station in real time using an exclusive microwave communication circuit. The TVRI Makassar Station currently does not own any FPU, and therefore, a programme recorded in the field can only be broadcast by transporting the recorded tape to the station. If necessary, the TVRI Makassar Station uses a PT.TELKOM line for the relay of out of station or emergency programmes but the user fee of this line is a serious financial burden on the station. If an FPU is procured, the TVRI Makassar Station will be able to relay immediately programmes recorded outside and reduce the operation cost.

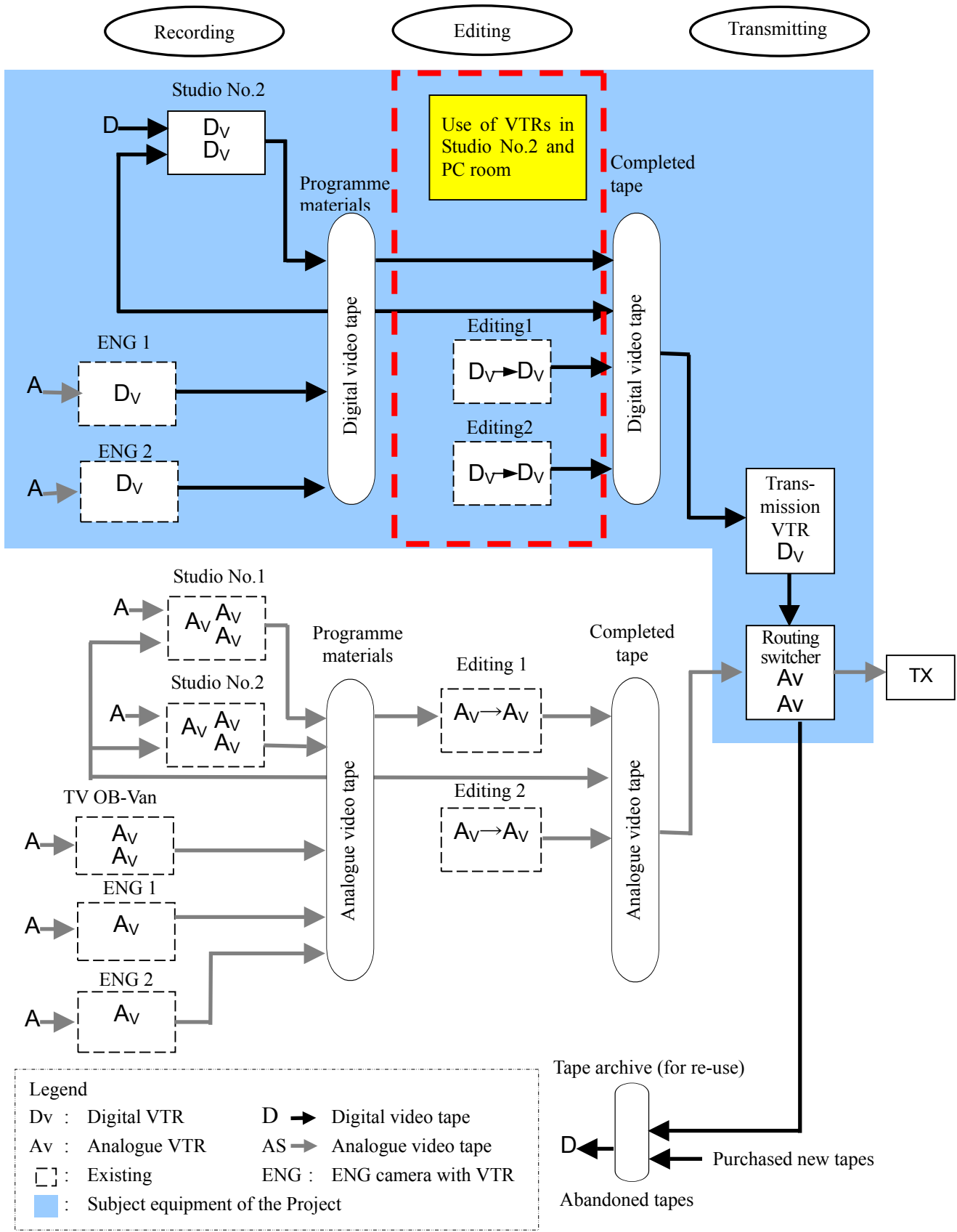


Fig. 2-2-2 Flow of VTR Tapes (Analogue and Digital)
After Implementation of the Project

viii) Measurement Tools

Adequate routine maintenance is essential to maintain the broadcasting systems in good condition and it is necessary for any broadcasting station to possess measurement tools which are capable of accurately identifying the operating state of equipment. Moreover, regular measurement and evaluation of the picture and sound quality are necessary for any TV broadcasting station to maintain the broadcasting network. Accordingly, the procurement of measurement tools is considered necessary.

ix) Consumables

Consumables which are required for the minimum operation of the broadcasting equipment under the Project are tapes for one year.

(2) Equipment Plan

The range of equipment to be procured under the Project for the TVRI Makassar Station is largely classified into equipment for Studio No.2, for the PC room, for editing room and for others. The details of the equipment to be provided are described below.

1) Configuration of Broadcasting Equipment

The renewal of programme-making equipment mainly features equipment for both Studio No.2 and the PC room, taking the incorporation of usable existing equipment, exchangeability with the equipment owned by the TVRI Jakarta Station and the distribution of taped programmes to other stations into consideration. To ensure the reliability of the TVRI Makassar Station as a public broadcasting station, the planning of the equipment will secure the redundancy of the main systems, including dual power sources.

In preparation for future extension, extra consideration will be given to including installation connecting terminals to facilities and equipment which will enable the exchange of programmes with the TVRI Jakarta Station using satellite transmission in addition to local broadcasting in the Makassar area. The existing lighting system of Studio No.2, particularly lighting equipment, is not fully functional because of age and, therefore, the lighting system for Studio No.2 will be replaced under the Project.

The planned broadcasting equipment under the Project is outlined in Table 2-2-2.

Table 2-2-2 Outline of the Broadcasting Equipment Procured under the Project

Room		Purpose of Use	Main Equipment
1. Studio No.2	1.1 Studio Floor	To produce live or recorded quiz shows, talk shows and dramas	<ul style="list-style-type: none"> a. Three colour cameras (one with a high position boom function) b. Lighting equipment (to be installed using the existing grid) c. Floor video monitor (with Jeep box) d. Floor audio monitor (with Jeep box) e. Intercommunication system for the floor director f. Various types of microphones, stands and wireless microphones g. Clock (on the wall of the production floor) h. Equipment connector boards on the walls of the production floor i. On-air indication light (manual control)
	1.2 Studio Sub-Control Room	To house production consoles for Studio and auxiliary equipment	<ul style="list-style-type: none"> a. Digital production switcher (with digital video effector) b. Digital audio mixer c. Character generator d. Lighting console and dimmer rack e. Console (switcher, CCU control and various remote control functions) f. Additional video monitor shelf (to monitor incoming and outgoing pictures) g. Audio monitor/speaker h. VCR for recording and VCR for playback i. Auxiliary audio equipment (DAT, CD, cassette tape recorder, MD and sound effector) j. Equipment rack k. Intercommunication system l. Clock m. On-air light (manual control)
2. PC Room	2.1 Programme Switcher/ Monitoring	To switch on and off and to monitor broadcasting. To act as the sub-control room for the news studio	<ul style="list-style-type: none"> a. Video and audio console b. Video monitor shelf c. Audio monitor/speaker d. Delivery VCR (local, net, distribution) e. Character generator f. Logo/time generator (for logo/time superimposition) g. Auxiliary audio equipment (DAT, CD, cassette tape recorder) h. Automatic level controller (at the final output stage to stabilise the sound level of broadcasting) i. Equipment rack (installation of video switcher, audio switcher and auxiliary equipment) j. Studio intercommunication system k. Room to room communication system) l. Quartz clock m. AVR

Room		Purpose of Use	Main Equipment
	2.2 News Studio Camera	To accompany the PC room and to be mainly used for live broadcasting	a. Colour camera (x 2) b. Lighting equipment c. Quartz clock
3. Equipment for Editing Room	One to One Editing System (Two Sets)	To conduct editing for news programme	a. Editing control unit b. Digital video player c. Digital video recorder d. Video and audio monitor
4. News Programme Production Equipment	ENG Equipment (Two Sets)	To conduct ENG	a. ENG camera (x 2) b. Portable DAT c. Portable mixer (4 CH, battery-powered) d. Interview microphones e. Outdoor monitor f. Battery (rechargeable type)
5. Field Pick up Unit (FPU)	(One Set)	To transmit from the field	a. FPU transmitter and receiver b. Tripod
6. Measurement Tools	(One Set)	To maintain broadcasting equipment	a. Video signal analyser b. Audio analyser c. Signal generator d. Oscilloscope e. Others
7. Consumables	(One Set)	Minimum quantities of spare parts for operating the planned equipment for a year	Tapes and others

2) Air-Conditioning System (to be renewed by the Indonesian side)

The performance and service life of most broadcasting equipment, remote control systems, automatic operation systems, memory systems, operation support systems, and electrical components like LSIs and condensers suffer from high temperatures. It is thus necessary to control temperature.

It is highly desirable for the rooms which house such systems to be air-conditioned. A central air-conditioning system is particularly recommended for important broadcasting equipment, and this type of system offers a reliable noise reduction and anti-condensation performance.

The existing air-conditioning system of the TVRI Makassar Station uses both a central system and a separate system.

The prospect of introducing different air-conditioning systems under the Project is outlined below.

i) Central Air-Conditioning System

The performance of the existing air-conditioning system has deteriorated as the system is more than 20 years old. The chiller and air handling unit will be renewed under the Project. As the existing air-conditioning ducts are in good condition, these ducts will be used for the Project. The facilities to be served by the central air-conditioning system will be Studio No.2 and the news studio, etc., which are directly related to actual broadcasting.

ii) Separate Air-Conditioning System

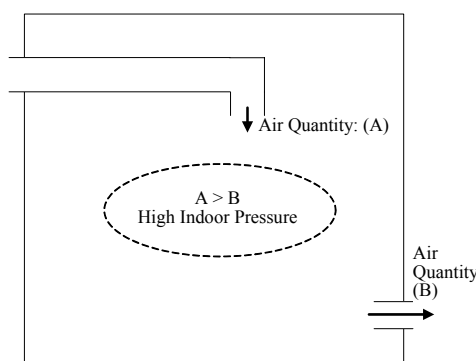
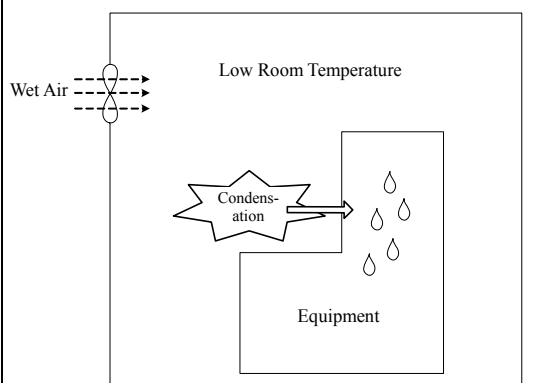
In view of the non-availability of air ducts, a separate air-conditioning system will be employed for the editing room (currently used as a tape storage room) on the first floor.

The new air-conditioning system planned for the TVRI Makassar Station under the Project will involve replacement of the main equipment while using the ducts for the existing central air-conditioning system. The planned use of an outdoor package type chiller will make it unnecessary to remove or repair the existing equipment, facilitating the implementation of the work. The new air handling unit will be installed in the existing air blowing room because of the need to connect it to the existing air duct. This means that removal of the existing fan will be required.

The differences between the central system and separate system are shown in Table 2-2-3.

Table 2-2-3 Comparison between Central and Separate Air-Conditioning systems

	Central Air-Conditioning System	Separate Air-Conditioning System
Configuration		
Temperature Control	While the temperature control method is the same as that for the separate system, the absence of a chiller away from these rooms results in a low noise level.	As the capacity of each system is limited, several units may be required to achieve the required performance level, possibly creating a noise problem.

	Central Air-Conditioning System	Separate Air-Conditioning System
Dust Control	<p>It is possible to shut out the intrusion of external air into the rooms by feeding high pressure cool air.</p> <p>The air blown into the rooms is filtered to remove dust.</p> 	<p>In the case of rooms facing the outside, some degree of dust control is possible with the use of a fan equipped with a filter. A measure to reduce the noise produced by the fan is required.</p>
Anti-Condensation Measure	<p>As cool air undergoes a humidity control process, there is less likelihood of the occurrence of condensation.</p>	<p>As local data shows, there is a major difference in the humidity level between the outdoor air and indoor air of the TVRI Makassar Station. The intake of humid outdoor air by a fan into rooms with a lower temperature for ventilation can result in condensation on the surface of equipment, possibly causing such adverse effects as rust and electricity leakage.</p> 
Cost	Approximately ¥10 million for one system	Approximately ¥0.4 million per room
General Assessment	<p>Although the cost is high, this system is effective to prevent condensation in regard to equipment. The noise level is low with the use of the existing ducts. The use of this system for a broadcasting station is recommended.</p>	<p>Although the cost is low, there is a problem of condensation. The expected service life is generally shorter than that of a central system. In general, this type of system is not recommended for a broadcasting station using important equipment. However, the use of this type of system in localised areas where no existing ducts are available is possible.</p>

3) Removal of Existing Equipment, Procurement and Installation of Power Supply Facilities and Interior Work (to be undertaken by the Indonesian side)

In general, no architectural remodelling or additional construction work will be required for the rooms where the new broadcasting equipment to be provided under the Project will be installed. If editing and other types of equipment are to be installed in an office, the Indonesian side will be responsible for the introduction of partition walls to demarcate the different work zones and also for new electric wiring to each item of equipment. In regard to the existing power source, it has been confirmed that voltage fluctuation beyond the reference zone does not occur. Nevertheless, a small capacity power source stabilisation device and an uninterruptive power supply (UPS) will be installed by the Japanese side to protect the new equipment from a sudden voltage increase.

The relocation of the existing equipment, including the setting-up of a temporary studio during the work period, will be conducted by the Indonesian side at its own expense.

4) Other Work (to be undertaken by the Indonesian side)

While the installation of the equipment to be provided under the Project will be conducted by the Japanese side, the following installation work will be conducted by the Indonesian side because of the inclusion of facility rehabilitation work to be conducted by the Indonesian side.

i) Installation of Field Pick up Unit (FPU)

While a FPU will be installed to enable real-time transmission with a relay station, work to adjust its direction on the tower will be necessary. Therefore, although the installation work will be conducted by the Indonesian side, an engineer will be dispatched from Japan to provide guidance on directional adjustment and other work.

ii) Among the installation work for the lighting equipment for Studio No.2, the work to reinforce the station building to support the weight of the lighting equipment will be conducted by the Indonesian side.

(3) Equipment Installation Plan

The existing equipment is to be replaced with new equipment as shown in Table 2-2-4.

The detailed equipment list is shown in Table 2-2-5.

Table 2-2-4 Comparison between Existing Equipment and Project Components

No.	Existing Equipment	Year of Procurement	Qty*	New Equipment	Qty
I	Studio No. 2/Sub-Control Room			1. Studio No. 2/ Sub-Control Room	
1	Video Camera - Camera Control Unit - Tripod	1994	3	1.1 Digital Video Camera - Camera Control Unit (with a crane) - Tripod	3 sets
2	Video SW Console - Synchronisation System - OA Tally System	1994	1	1.2 Digital Video System - Video SW Console (including DDA) - Video Effector - A/D Converter - D/A Converter	1 set
3	Video Distribution Amplifier	1994	1	1.3 Synchronisation System 1.4 Tally System and OA Light	1 set 1 set
4	VCR	1994	1	1.5 Digital VCR	3 sets
5	VCR (Betacam SP)	1994	1		
6	VCR (Betacam SP)	1994	1		
7	Audio Mixer	1994	1	1.6 Digital Audio System - Audio Mixer - Multi-Effect Processor - Cassette Recorder - Mini-disc - DAT	1 set
8	Digital Reverberator	1994	1		
9	Audio Monitor Power Source	1994	1		
10	Audio Tape Recorder	1994	1		
11	Video Monitor B/W 12"	1980	10 (2)	1.7 Monitoring System Equipment (A/V)	1 set
12	Video Monitor Colour 15"	1983	3		
13	Video Monitor Colour 20"	1983	2		
14	Studio Intercom	1980	3	1.8 Intercom System	1 set
15	Room to Room Intercom	1980	2		
16	Dimmer	1980	1	1.9 Lighting System	1 set
17	Lighting Control Console	1980	2		
18	Dimmer	1980	20		
19	Dimmer	1980	1		
20	Dimmer Switcher	1980	1		
21	Dimmer	1980	1	1.10 Character Generator	1 set
II	PC Room/Acc. Room			2. PC Room	
1	Video Camera	1994	1	2.1 Digital Video Camera - Camera Control Unit (without Prompter) - Tripod and Dolly	2 sets
2	Video Camera	1994	1		
3	Tripod and Dolly	1994	1		
4	Tripod and Dolly	1994	1		
5	Tripod and Dolly	1994	1		
6	Audio Tape Reel	1994	1	2.2 PC Room Equipment - DAT - Effector - CD Player and Microphones - Cassette Recorder - Stand - MD Recorder - Audio Mixer	1 set
7	CD Player	1994	1		
8	Reverberator	1994	1		
9	Audio Tape Recorder	1994	1		
10	Video SW Console (8 ch) - Studio Intercom	1994	1	- Video SW console - Studio Intercom	
11	Audio Mixer (8 ch) - Microphones	1994	1	- Audio Monitor	
12	Audio Monitor	1994	1	- Feeding VCR	
13	Video Distribution Amplifier	1994	2		
14	VCR	1994	1		

No.	Existing Equipment	Year of Procurement	Qty*	New Equipment	Qty
15	VCR	1994	1		
16	Character Generator	1994	1	- Character Generator	
17	OCP	1994	1	- Video Monitor	
18	Video Monitor 10"	1994	1		
19	Video Monitor 19"	1994	1		
20	Video Monitor 14"	1994	2		
21	Video Monitor 13"	1994	4		
22	Video Monitor 16"	1994	2		
23	Video Monitor 5"	1994	2		
24	Video Monitor B/W	1994	6		
25	Audio Monitor	1994	1		
26	Audio Monitor Power Source	1994	1		
III	Main Control Room			2.3 PC Room Control System	1 set
1	Control Console	1993	4	- Console	
2	Remote Control Panel	1980/81	3	- System Rack	
3	PDL	1980/81	1		
4	ABA	1980/81	9		
5	ADA	1980/81	5		
6	Time Base Collector	1994	1		
7	Video Monitor B/W	1994	3	- Monitors	1 set
8	Video Monitor 10"	1994	1		
9	Video Monitor 14"	1994	2		
11	Monitor Switcher	1994	1		
12	Waveform Monitor	1980/81	3 (1)		
13	Video Interface	1994	3 (1)	- Sync Signal Equipment	1 set
14	Pulse Generator	1994	2 (1)		
15	Sync Signal Switcher	1994	1		
16	PAL Sync Signal Generator	1994	2 (1)		
17	Intercom	1994	1	- Intercom System	1 set
IV	Editing Room (GF)			3. News Programme Production Equipment	
1	TV Monitor 19"	1983	1	3.1 One to One Editing System	2 set
2	VCR (Betacam SP)	1994	1		
3	VCR (Betacam SP)	1994	1		
4	VTR Player (Betacam (SP)	1997	4		
5	VTR Recorder (Betacam SP)	1997	2		
V	Maintenance Room				
1	Video Camera (CCD Camera Head)	1995	1	3.2 ENG Camera System	2 sets
2	Video Camera (CCD Camera Head)	1995	4		
	Oscilloscope and Others	1980		4. Measuring Tools	1 set
				5. Consumables	1 set
VI	TV OB-Van				
	FPU System	1993		6. FPU System	1 set

Notes: Number in parenthesis means number of out of order

2-2-5 Equipment Component

No.	Equipment	Description	Q'ty
1.	Studio No.2 System		
1.1	Digital Camera System		
	-1 CCD Camera Studio Type		<u>3 sets</u>
		Camera	3 pcs
		Camera Adaptor	3 pcs
		X21 Zoom Lens	3 pcs
		Zoom Rate Demand Unit	3 pcs
		Focus Control Unit	3 pcs
		Lens Mount Adapter	3 pcs
		B/W 5" Viewfinder	3 pcs
		Triax Camera Cable (20m : CCU-Camera)	3 pcs
		Triax Camera Cable (100m : Connecfor-Camera)	3 pcs
		Reel For Camera Cable	3 pcs
		CN Panel (Camera)	1 pc
		CN Panel (A/V)	2 pcs
	-2 Pedestal		<u>2 sets</u>
		Pedestal	2 pcs
		Cam Head	2 pcs
		Pan Bar	2 pcs
		Tripod Attachment	2 pcs
		Script Holder With Arm	2 pcs
	-3 Camera Crane		<u>1 set</u>
		Camera Crane	1 pc
		Cam Head	1 pc
		Pan Bar	2 pcs
		Tripod Attachment	1 pc
		Script Holder With Arm	1 pc
	-4 Camera Control Unit		<u>3 sets</u>
		Camera Control Unit	3 pcs
		Remote Control Panel	3 pcs
		Camera Cable (3m)	3 pcs
	-5 Test Chart Set		<u>1 set</u>
		Test Chart	1 pc
		Test Chart Stand	1 pc
1.2	Video System Equipment		
	-1 Digital Production Switcher		<u>1 set</u>
		Digital Video Switcher (8input or more)	1 pc
		Rack Mount Kit	1 pc
	-2 Digital Video Effect W/3D Effects		<u>1 set</u>
	-3 Frame Synchronizer		<u>2 sets</u>
		Frame Synchronizer	
	-4 Analog To Digital Video Converter		<u>1 lot</u>
	-5 Digital To Analog Video Converter		<u>1 lot</u>

No.	Equipment	Description	Q'ty
-6	VDA, VJ, Rack, Console		1 lot
		Video Patch Panel (BTS)	8 pcs
		Video Patch Cable (300mm)	30 pcs
		Video Patch Cable (500mm)	30 pcs
		Video Patch Cable (1000mm)	30 pcs
		Control Console	1 pc
		19-inch System Rack	3 pcs
		Power Amplifier	5 pcs
-7	Video Routing Switcher		1 set
		VE Switch Panel	1 pc
		Switch Panel	1 pc
1.3 VTR			
-1	Digital VCR (PB / REC)		2 sets
		Video Cassette Recorder	2 pcs
		Rack Mount Kit	2 pcs
		9-inch Color Video Monitor	2 pcs
		Rack Mount Bracket	2 pcs
		Audio Monitor Speaker	2 pcs
		Tally Panel	2 pcs
		VTR Remote Panel	2 pcs
		19-inch System Rack	2 pcs
-2	Digital VCR (PB)		1 set
		Video Cassette Player	1 pc
		Rack Mount Kit	1 pc
		TBC Remote Controller	1 pc
		9-inch Color Video Monitor	1 pc
		Rack Mount Bracket	1 pc
		Audio Monitor Speaker	1 pc
		Tally Panel	1 pc
		19-inch System Rack	1 pc
1.4 Audio System Equipment			
-1	Digital Audio Mixer		1 set
		Digital Audio Mixer (16ch or more)	1 pc
		Speaker	1 pc
		Power Amplifier	1 pc
-2	Digital Audio Tape Recorder		1 set
		DAT Recorder	1 pc
		Wired Remote Commander	1 pc
-3	Compact Disk Player		1 set
		CD Recorder/Player	1 pc
-4	Audio Cassette Recorder		1 pc
		Audio Tape Recorder	1 pc
		Remote Control Unit	1 pc
-5	Mini Disk Player		1 pc
		Mini Disc Recorder/Player	1 pc
-6	Audio Effector		1 pc
		Multi Effect Processor	1 pc
-7	Audio Delay		1 pc
		Audio Delay	1 pc

No.	Equipment	Description	Q'ty
-8	Talkback System		1 lot
		Speaker	1 pc
		Power Amplifier	1 pc
-9	Audio Distributor		1 lot
		ADA	1 lot
-10	Microphone		
	A. Dynamic Microphone		6 pcs
	B. Condenser Microphone		4 pcs
	C. Wireless Microphone		1 set
		Wireless Microphone Hand Type	1 pc
		Wireless Transmitter	1 pc
		Lavalier Microphone	1 pc
		Tuner Base Unit	1 pc
		UHF Synthesizer Tuner Unit	2 pcs
		UHF Antenna	1 pc
-11	Microphone Stand		1 lot
		Microphone Floor Stand	4 pcs
		Goose Neck Floor Stand	1 pc
		Microphone Boom Stand	4 pcs
		Table Microphone Stand	4 pcs
-12	Microphone Cable		1 lot
		Microphone Cable w/Plug	10 pcs
-13	Stereo Headphone		1 set
		Stereo Headphone	3 pcs
-14	AJ, Console, Rack		1 lot
		Audio Patch Panel	4 pcs
		Audio Patch Cable (300mm)	10 pcs
		Audio Patch Cable (500mm)	15 pcs
1.5	Sync Signal Equipment		
-1	Sync Signal Generator		1 set
1.6	Video Distribution Amplifier		
-1	Analog Video Distribution Amplifier		1 lot
		VDA	1 lot
-2	Digital Video Interface		1 lot
		DDA	1 lot
1.7	Monitoring System Equipment		
-1	Video Master Monitor		1 set
		14-inch Color Video Master Monitor	1 pc
		Rack Mount Kit	1 pc
-2	Video Monitor		1 lot
		14-inch Color Video Monitor	12 pcs
		20-inch Color Video Monitor	3 pcs
		LD Monitor Selector	1 pc

No.	Equipment	Description	Q'ty
-3	Studio Floor Video Monitor		1 lot
		20-Inch Color Video Monitor	2 pcs
		Floor Monitor Stand	2 pcs
		Jeep Box	2 pcs
		Jeep Cable	2 pcs
-4	Waveform Monitor		1 set
		Analog and Digital Waveform Monitor	1 pc
-5	Vector Scope		1 set
		WFM/Vector Scope Pal	1 pc
		Rack Mount Kit	1 pc
-6	Audio Monitor		1 lot
		Power Amplifier	1 pc
		Speaker	2 pcs
		Speaker Stand	2 pcs
-7	Studio Floor Audio Monitor		1 lot
		Speaker	4 pcs
		Speaker Holder	4 pcs
		Power Amplifier	1 pcs
-8	Video Monitor Shelf		1 set
		VE Monitor Stand	1 pc
		Monitor Shelf	1 pc
-9	Air Video Monitor		1 set
		20-inch Color Video Monitor	1 pc
1.8	Character Generator		1 set
		Character Generator	1 pc
		14-inch Color Video Monitor	2 pcs
		Serial Digital Interface	1 pc
		C.G Take Switch Panel	1 pc
		UPS	1 pc
1.9	Intercom System		
-1	Studio Intercommunication System		1 lot
		Intercom Unit	1 pc
		Intercom I/F Unit	3 pcs
		Intercom Headset	7 pcs
		Intercom Jack Panel	5 pcs
		PD Sw Panel	1 pc
		Belt Pack	2 pcs
-2	Telephone Hybrid		1 set
		Telephone Hybrid	2 pc

No.	Equipment	Description	Q'ty
1.10	On-Air Light		
	-1 Oa Tally Logic		1 pc
	-2 OA Tally Light For Monitor		1 set
	-3 OA Tally Light For Floor		1 set
		On Air Light	2 pcs
		On Air Light Control Unit	1 pc
1.11	Lighting System		
	-1 Dimmer Rack		1 lot
		SCR DIMMER SYSTEM	
		Control Rack	
		Electric Plugging Rack	
		Accessory	
	-2 Lighting Control Console Studio-2		1 lot
			1 set
		CRT Monitor ×1	
		Patch Control Unit	
		Memory function	
		Accessory	
	PC Room		1 set
	-3 Manual Suspension System		1 set
		3cir 3br, Wire, Rope, Plug & Pulley For Lighting Batten	8 pcs
		3cir 3br, Wire, Rope, Plug & Pulley For Back Batten	3 pcs
		3cir 6br, Wire, Rope, Plug & Pulley For Upper Horizont Batten	3 pcs
	-4 Floor Plug		1 set
		18cir 3br For Lore horizont & Floor Consent	
	-5 Lighting Equipment		1 set
		1kw Fresnel Spotlight with halogen lamp	24 pcs
		2kw Fresnel Spotlight with halogen lamp	12 pcs
		1000W (500Wx2) Flood Light with halogen lamp	22 pcs
	-6 Outlet Box		1 set
		30A 3 Outlet	12 pcs
	-7 Accessories		1 set
		Clamp Hanger	60 pcs
		Stand With Caster	4 pcs
		Stand	4 pcs

No.	Equipment	Description	Q'ty
		Extension Cable 2m w/Plug	20 pcs
		Extension Cable 5m w/Plug	10 pcs
		Extension Cable 10m w/Plug	10 pcs
		Color Filter	100 pcs
	-8 Spare lamp		<u>1 set</u>
		1kw Lamp For Fresnel Spotlight	72 pcs
		2kw Lamp For Fresnel Spotlight	36 pcs
		500W Lamp For Floodlight	212 pcs
1.12	Clock		
		Quartz Clock	<u>2 pcs</u>
1.13	AVR		
		Auto voltage regulator	<u>1 set</u>
2.	Program Continuity Room		
2.1	Digital Camera		
	-1 CCD Camera		<u>2 sets</u>
		Camera	2 pcs
		Camera Adaptor	2 pcs
		Zoom Lens X17	2 pcs
		Zoom Rate Demand Unit	2 pcs
		Focus Control Unit	2 pcs
		Lens Adaptor	4 pcs
		B/W 5"Viewfinder	2 pcs
		Triax Camera Cable(10m)	2 pcs
		Triax Camera Cable(15m)	2 pcs
		Camera Cable Reel	2 pcs
		CN Panel (Camera)	1 pc
		CN Panel (A/V)	2 pcs
	-2 Tripod		<u>2 sets</u>
		Cam Head	2 pcs
		Tripod W/Dolly	2 pcs
		Pan Bar	4 pcs
		Tripod Attachment	2 pcs
		Script Holder W/Arm	2 pcs
	-3 Camera Control Unit		<u>2 set</u>
		Camera Control Unit	2 pcs
		Remote Control Panel	2 pcs
		Camera Cable (3m)	2 pcs
	-4 Prompter System		<u>1 set</u>
		Prompter System	1 pc
		CPU	1 pc
		LCD	1 pc
		Distributor	1 pc
		Ceiling Mount Bracket	1 pc
		Camera Cable	1 pc
		Accessory	1 pc
	-5 Test Chart Set		<u>1 set</u>
		Test Chart	1 pc

No.	Equipment	Description	Q'ty
		Test Chart Stand	1 pc
2.2	PC System		
2.2.1	Digital Video System		
	-1 Digital Production Switcher		1 set
		Digital Production Switcher (8 input or more)	1 pc
		Control Panel	1 pc
		Rack Mount Kit	1 pc
	-2 Digital Video Switcher/Effect		1 lot
		3D Effector	1 pc
	-3 Frame Synchronizer		2 sets
		Frame Synchronizer	
	-4 Analog To Digital Video Converter		1 lot
	-5 Digital To Analog Video Converter		1 lot
	-6 VDA, VJ, Rack, Console		1 lot
		Video Patch Panel (BTS)	4 pcs
		Video Patch Cable (300mm)	20 pcs
		Video Patch Cable (500mm)	20 pcs
		Video Patch Cable (1000mm)	20 pcs
		Control Console	1 pc
		19-inch System Rack	2 pcs
		Power Amplifier	5 pcs
	-7 Video Routing Switcher		1 set
		VE Switch Panel	1 pc
2.2.2	VTR		
	-1 Digital VCR (REC/PB)		1 set
		Video Cassette Recorder	1 pc
		Rack Mount Kit	1 pc
		9-inch Color Video Monitor	1 pc
		Rack Mount Bracket	1 pc
		Audio Monitor Speaker	1 pc
		Tally Panel	1 pc
		VTR Remote Panel	1 pc
		19-inch System Rack	1 pc
	-2 Digital VCR (PB)		2 sets
		Video Cassette Player	2 pcs
		Rack Mount Kit	2 pcs
		TBC Remote Controller	2 pcs

No.	Equipment	Description	Q'ty
		9-inch Color Video Monitor	2 pcs
		Rack Mount Bracket	2 pcs
		Audio Monitor Speaker	2 pcs
		Tally Panel	2 pcs
		19-inch System Rack	2 pcs
2.2.3 Audio System			
-1	Digital Audio Mixer		1 set
		Digital Audio Mixer 10ch or more	1 pc
		Power Amplifier	1 pc
-2	Digital Audio Tape Recorder		1 set
		DAT Recorder	1 pc
		Wired Remote Commander	1 pc
-3	Compact Disk Recorder		1 set
		CD Recorder/Player	1 pc
-4	Audio Cassette Recorder		1 set
		Audio Tape Recorder	1 pc
		Remote Control Unit	1 pc
-5	Mini Disk Player		1 pc
		Mini Disc Recorder/Player	1 pc
-6	Audio Effector		1 pc
		Multi Effect Processor	1 pc
-7	Audio Delay		1 pc
		Audio Delay	1 pc
-8	ANN Cough Controller		1 pc
		Announce Cough Box	1 pc
-9	Talkback System		1 lot
		Speaker	1 pc
		Power Amplifier	1 pc
-10	Audio Distributor		1 lot
		ADA	1 pc
-11	Microphone and Cable		1 lot
	A. Dynamic Microphone		4 pcs
	B. Condenser Microphone		4 pcs
-12	Microphone Stand		4 pcs
-13	Stereo Headphone		1 set
		Stereo Headphone	2 pcs

No.	Equipment	Description	Q'ty
-14	AJ, Console, Rack, Announce Booth Equipment		1 lot
		Audio Patch Panel	3 pcs
		Audio Patch Cable (300mm)	10 pcs
		Audio Patch Cable (500mm)	15 pcs
		Audio Patch Cable (1000mm)	10 pcs
2.2.4 Sync Signal Equipment			
-1	Sync Signal Generator		1 lot
2.2.5 Video Distribution Amplifier			
-1	Analog Video Distribution Amplifier		1 lot
-2	Digital Video Interface		1 lot
2.2.6 Monitoring System Equipment			
-1	Video Master Monitor		1 set
		14-inch Color Video Master Monitor	1 pc
		Rack Mount Kit	1 pc
-2	Video Monitor		1 lot
		14-inch Color Video Monitor	10 pcs
		20-inch Color Video Monitor	2 pcs
-3	Studio Floor Video Monitor		1 lot
		20-inch Color Video Monitor	1 pc
		Floor Monitor Stand	1 pc
		Jeep Box	1 pc
		Jeep Cable	1 pc
		CN Panel (A/V)	1 pc
-4	Waveform Monitor		1 set
		Waveform Monitor Pal	1 pc
-5	Vector Scope		1 set
		Vector Scope Pal	1 pc
		Rack Mount Kit	1 pc
-6	Audio Monitor		1 lot
		Power Amplifier	1 pc
		Speaker	2 pcs
		Speaker Stand	2 pcs
-7	Studio Floor Audio Monitor		1 lot
		Speaker	4 pcs
		Speaker Holder	4 pcs
		Power Amplifier	1 pc
-8	Video Monitor Shelf		1 pc
		Video Monitor Shelf	1 pc

No.	Equipment	Description	Q'ty
-9	Air Video Monitor	20-inch Color Video Monitor	1 set 1 pc
2.2.7 Computer Graphics			
-1	Character Generator	Character Generator 14-inch Color Video Monitor Serial Digital Interface C.G Take Switch Panel UPS	1 set 1 pc 2 pcs 1 pc 1 pc 1 pc
-2	Logo Generator		1 set
2.2.8 Intercom System			
-1	Studio Intercommunication System	Intercom Unit Intercom I/F Unit Intercom Headset Intercom Jack Panel PD Sw Panel Belt Pack	1 lot 1 pc 2 pcs 6 pcs 5 pcs 1 pc 1 pc
-2	Room To Room Communication System	Terminals	1 lot 3 pcs
2.2.9 Tally System And On-Air Light			
-1	OA Tally Logic	Tally Control Unit	1 set 1 pc
-2	OA Tally Light For Monitor		1 set
-3	OA Tally Light For Floor	On Air Light On Air Light Control Unit	1 set 2 pcs 1 pc
2.2.10 Clock			
		Quartz Clock	3 sets
2.2.11 Output Switcher (A/V married)			
-1	Output Switcher	Video/Audio Switcher(5 input or more) VDA (analog) Video Jack Field w/patch cable ADA (Analog) Audio Level Controller Audio Jack Field w/patch cable	1 set 1 pc 1 pc 1 lot 1 pc 2 pcs 1 lot

No.	Equipment	Description	Q'ty
-2	Monitoring Equipment		1 set
		14-inch Color Monitor	2 pcs
		Audio Monitor Speaker/Amp	1 pc
-3	Sync Signal Generator		1 set
		Main / Standby System	1 pc
-4	System Rack		1 set
2.2.12 AVR			
		Auto voltage regulator	1 set
3. 1 to 1 Editing System			2 sets
-1	Digital VCR		2 sets
		Video Cassette Recorder	2 pcs
		Video Cassette Player	2 pcs
-2	Editing Controller	Editing Control Unit	2 sets
-3	Video Monitor		1 set
		14-inch Color Video Monitor	4 pcs
-4	Accessory		2 sets
		Speaker	2 pcs
		Power Amplifier	2 pcs
-5	AVR		1 sets
		Auto voltage regulator	
4. One Piece Eng Camera Recorder			
-1	Camera Head		2 sets
		Camcorder	1 pc
-2	Shoulder Strap		2 sets
-3	Viewfinder 1.5"		2 sets
-4	Tripod Attachment		2 sets
		Tripod Attachment	2 pcs
-5	Wireless Microphone		2 sets
		Uhf Synthesized Tuner Unit	2 pcs
		Wireless Microphone	2 pcs
-6	Zoom Lens		2 sets
		X21 Zoom Lens	2 pcs
-7	Camera Lighting		2 sets
		Portable Lighting Kit	2 pcs
		Lamp 24v 200w 10pcs/Pack	2 pcs

No.	Equipment	Description	Q'ty
-8	Tripod + Spreader		2 sets
		Tripod	2 pcs
		Pan Bar	2 pcs
		Dolly	2 pcs
-9	Battery Charger		2 sets
-10	Battery Pack		1 set
		Rechargeable Battery	8 pcs
-11	AC Adaptor		2 sets
		AC Adaptor	2 sets
		Camera Connecting Cable	2 pcs
-12	Camera Carrying Case	Carrying Case	2 sets
-13	Accessory		2 lots
		5-inch Color Video Monitor	2 pcs
		Monitor ENG Kit	2 pcs
		Rain Jacket	2 pcs
		DAT Recorder	2 pcs
		Stereo Headphone	2 pcs
		Portable Audio Mixer	2 pcs
		EQ Unit	2 pcs
		Battery Case	2 pcs
		AC Adaptor	2 pcs
		A/V Cables	2 pcs
		Condenser Microphone	2 pcs
		Hand Grip	2 pcs
		Lavalier Microphone	2 pcs
		Dynamic Microphone	2 pcs
		Microphone Extension Cable 2m	2 pcs
		Microphone Extension Cable 5m	2 pcs
		Microphone Extension Cable 10m	2 pcs

5. FPU (Filed Pick-Up Unit)

-1	FPU (7ghz Band) W/Stand		1 set
-2	100m Cable W/Connector		1 set

No.	Equipment	Description	Q'ty
6. Measurement Tools			
-1	Analog Oscilloscope (400MHz)		1 set
		Oscilloscope 500MHz	1 pc
		Cart	1 pc
-2	Video Analyzer		1 set
-3	Video Signal Generator		1 set
		Multiformat Video Generator	1 pc
		Analog Genlock	1 pc
		Digital Video Generator	1 pc
		Audio Generator	1 pc
		Signal Generator	1 pc
-4	Analog Audio Analyzer	Audio Measuring/Analyzer	1 set
-5	Tool Kit		1 set
-6	Alighment Tape		1 set
-7	Patching Cables		
		Digital And Analog Video Patch Cable	10 pcs
		Digital Audio Patch Cable	10 pcs
		Analog Audio Patch Cable	10 pcs
7 Consumable Parts			
		Video Cassette Tape For Studio (90 min)	100 pcs
		Video Cassette Tape For ENG (60 min)	100 pcs
		Digital Audio Cassette Tape (60 min)	50 pcs
8. Others			
-1	Equipment Desk		2 pcs
	For Studio No.2		1 pc
	For PC room		1 pc
-2	Operation Chair		15 pcs
	For Studio No.2		8 pcs
	For PC room		7 pcs
9. Installation Materials			
	Connection cables and materials		1 lot