

ATTACHMENT OF PART SCHEME

A TECHNICAL LITERATURE

JAPANESE TELEVISION MISSION

UNDER THE COLOMBO PLAN

OVERSEAS TECHNICAL COOPERATION AGENCY

TOKYO

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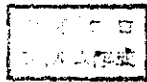
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ATTACHMENT OF PART SCHEME A

TECHNICAL LITERATURE

Technical Literature

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(1) Antenna Supporting Masts

(1) Requirements

- (a) These masts shall be installed at TV Stations in Pakistan for supporting the TV transmitting antennas.
- (b) They shall be satisfied with the following performances.

(2) Performances

- 1) Type : Self supporting Type.
- 2) Height : Subject to specified height of respective station.
- 3) Wind Loading : They shall stand for the wind velocity of 100 miles/hour when Superturnstile Antennas and Main Feeders are attached.
- 4) Finish : They shall be Hot Dip galvanized and shall be painted according to ICAO standard.
- 5) Aviation Obstruction Light : Aviation obstruction lights shall be mounted according to ICAO standard.

(2) Transmitting Antennas and Feeders

(1) Requirements

- (a) These antennas are to be installed at transmitting station in TV Station in Pakistan.
- (b) They shall be satisfied with the following performances.

(2) Performances

(a) Transmitting Antenna

- 1) Type : Superturnstile
- 2) Frequency Range : one specified TV channel
- 3) Input impedance : 50 ohms
- 4) Power ratings : Subject to the allocated output power of respective transmitter, in respect to safety operation.
- 5) V. S. W. R. : 1.1 or less at operating frequency
- 6) Horizontal Directivity : omni-directional pattern, deviation less than ± 2 db
- 7) Power gain : Subject to the allocated ERP of respective transmitter.
- 8) Wind Loading : They shall withstand a wind loading resulting from a wind velocity of 100 mile/hour.

(b) Main Feeder

- 1) Feeding System : the R.F. power is to be fed by dual run system with a bridge diplexer.
- 2) Type : $\frac{15}{8}$ " (O.D.) rigid coaxial transmission line
- 3) Characteristics Impedance : 50 ohms
- 4) V.S.W.R. : 1.05 or less
- 5) Maximum power rating : continuous average 7KW at 200Mc/s
- 6) Loss : less than 1.0 db/100 m at 200Mc/s

(3) TV Transmitter

(1) Requirements

- a) This transmitting equipment used in unattended station shall be stable in its operation.
- b) The transmitter will be connected to the earth system provided by the orderer. (Two kinds of earth system, one for transmitting equipment and the other for Power receiving equipment, will be provided separately).
- c) The equipment is required to do complete operation under the circumstance of non-synchronizing operation.
- d) Metal Semi-Conductor rectifier shall be used for power supply.
- e) FM Reactance Tube Modulation System shall be used as master oscillator of the aural transmitter.
- f) The quality of transmitter shall be Satisfied with the following performance.

Main electrical characteristics are as follows:

Electrical characteristics	5KW/1KW/300W
Type of Emission:	A5 and F3
Output	Specified separately
Frequency Range	54 - 88 Mc (BAND I) 174 - 216 Mc (BAND III)
Carrier Frequency Stability	Within ± 500 c/s
Power Source	200 V/220 V 3-phase or 100V Single 50 c/s
Temperature Rise	When transmitter is operated continuously in the normal operating condition, temperature rise of each part except heat-generating elements is less than 50°C
Visual Characteristics	
Radio-Frequency Output Connection	Connected to 1-5/8", 50 ohms coaxial feeder
Input Polarity	Negative synchronizing pulse
	Deviation from the ideal response curve specified in CCIR is as follows:
Video Frequency Response	Within ± 1 db at 0.5 Mc Within ± 1 db at 1.25 Mc Within ± 2 db in 5 Mc band
Lower Sideband Attenuation (including VSBF)	Strength of the lower sideband when modulation is effected by a signal frequency above 1.25 Mc, is less than -20 db, compared with that when modulation is made with 200 Kc.
Linearity	Less than 5% between the white and pedestal levels
Output Impedance	50 ohms
Input Level	1 V (p-p)
Input Impedance	75 ohms ± 5 ohms

Electrical characteristics	5KW/1KW/300W
Carrier Pedestal Level	75 (± 1.5)% of the peak level of synchronising pulse
Carrier White Level	15 ($+0$) (-5)% of the peak level of synchronising pulse
Frequency Modulation	Less than -40 db (50 c/s to 15Kc)
Noise	Better than -50 db
Anral Characteristics Frequency Deviation	± 50 Kc, 100% modulation
Voice Frequency Response	Less than 1 db in the range 50 to 15,000 c/s
Voice Input Level	Program input level is +10 dbm for 100% modulation (frequency deviation ± 50 Kc)
Voice Input Impedance	600 ohms $\pm 10\%$
AM Noise Level	Better than -50 db with 100% modulation (50 to 15,000 c/s)
FM Noise Level	Better than -60 db with 100% modulation (50 to 15,000 c/s, 50 μ s pre-emphasis circuit weighted value)
Voice Frequency	Pre-emphasis is effected by a series resistance-inductance circuit having a time constant of 50 μ s. Pre-emphasis frequency characteristics is within ± 1.5 db of the standard calculated value.
Distortion	Less than 1.5% in the range 50 to 15,000 c/s Less than 1% in the range 100 to 7,500 c/s

(4) VSB Filter

(1) Requirements

- (a) These equipments are used to obtain VSB (Vestigial Side Band) characteristics of the visual transmitters that is to attenuate the lower side band output of a double side band visual transmitter.

It is necessary to make input impedance matching and to provide attenuation in excess of 20 db for a frequency band corresponding to a lower side band lower than, 1.25 MCS off the visual carrier.

It is also the necessary conditions for the VSB Filter that the insertion loss in the VSB Filter within the pass band be small.

- (b) In small power station, these filters should be inserted in young stage, at that time large size rigid coaxial type filter is unnecessary.

- (c) It shall be satisfied with the following performances.

(2) Technical Performances

	Dacca, Lahore Karachi & Rawalpindi	Other stations
1. Input and Output Terminal:	15/8" coaxial feeder	N-Type
2. Input impedance:	50 ohms	"
3. Power Rating:	5KW (Synch peak)	1 watt
4. Frequency Range:	Specified one TV channel	approx 30Mc/s
5. VSWR:	1.1 or less in operating TV channel	approx 1.1
6. Insertion loss:	0.3 db or less at visual carrier	not specified

(5) Bridge Diplexer

(1) Requirements

- (a) This equipment is used for feeding single antenna with both visual and aural transmitting signal without causing mutual interference.
- (b) It shall be satisfied with the following performances.

(2) Technical Performances

Ratings

1. Input and output terminals: 15/8" coaxial feeder
2. Input impedance: 50 ohms
3. Power rating: Visual 5KW (Synch peak valve)
Aural 1KW (Average)
4. Frequency Range: TV 1 channel
5. VSWR
Visual input 1.05 or less at one TV channel in Band III
1.07 or less at one TV channel in Band I
Aural input 1.05 or less at aural carrier frequency ± 1 Mc/s in Band III
1.07 or less at aural carrier frequency ± 1 Mc/s Band I
6. Insertion loss: 0.3 db or less at operating frequency

(6) Dummy Antenna

(1) Requirements

(a) This equipment is used as a load of TV transmitter for their adjustment also to measure the output power of them.

It is necessary to consume safely all power of transmitter, and to make input impedance matching.

(b) It shall be satisfied with the following performances.

(2) Technical Performances

- 1) Power consumption : Depend on the respective transmitter power
- 2) Input impedance : 50 ohms
- 3) Frequency Range : one specified TV channel
- 4) Operation : continuous
- 5) Ambient Temperature : 0 -- 45°C
- 6) Cooling Method : Forced or natural Air Cooled type
- 7) V.S.W.R. : less than 1.07 in Operating TV channel
- 8) Power Meter : Direct reading type:

(7) 7000MC TELEVISION RELAY EQUIPMENT (F.P.U.)

(1) Requirements

Television Relay Equipment shall operate in 7000 Mc Band, the transmitter output shall not be less than 1 watt.

Special consideration shall be given in design of this equipment for the improvement of transmission characteristics, stable operation and for the reduction of weight.

This equipment shall be used in transmitting a color TV signal.

(2) Performance

1.1 Transmitting equipment

Carrier frequency range	6420 Mc/s 7125 Mc/s
Output	1 watt
Modulation	Frequency-modulation system
Frequency deviation	5 Mc/s (peak-to-peak)
Video signal input (Synchronizing signal is in negative direction.)	1.0 volt (peak-to-peak)
Video signal input impedance	75 ohms $\pm 10\%$
Power supply	80 -- 117 volt A.C., single phase, 50
Antenna gain (4-ft diameter parabolic reflector)	Approx. 36 db

1.2 Receiving equipment

Reception frequency range	6420 Mc/s -- 7125 Mc/s
Center frequency of IF band	70 Mc/s
Intermediate-frequency band width	± 10 Mc/s
Intermediate-frequency gain (in case of 50m cable)	In excess of approx. 80 db

Noise figure	Less than 15 db
Video signal output (Synchronizing signal is in negative direction.)	1.0 volt (peak-to-peak)
Monitor video signal output (Synchronizing signal is in negative direction.)	1.0 volt (peak-to-peak)
Video signal and monitoring signal output impedance	75 +10%
Automatic frequency control pull-in range	In excess of ± 3 Mc/s
Power supply	80-117 volt A.C., single phase, 50 c/s
Antenna gain (4-ft diameter parabolic reflector)	Approx. 36 db

(3) Overall characteristics

Video frequency response:	Response is kept within the limit of ± 0.4 db within the frequency range from 60 c/s to 6 Mc/s.
Differential gain	Approx. 0.5 db
Differential phase	Approx. 1 degree
Square wave transmission characteristics	
(1) 60 cycle Square wave tilt	Less than 1.5% of total amplitude
(2) Rise time for 100 kc/s Square wave	Less than 0.07 μ sec.
(3) Overshoot for 100 kc/s Square wave	
Time interval after center of step	
0.15 0.4 μ sec.	Within $\pm 4\%$
0.4 0.8 μ sec.	Within $\pm 1\%$
In excess of 0.8 μ sec.	Within $\pm 0.5\%$
Hum level	Below -55 db (P-P/P-P) (at 5 c/s P-P)

(8) Video Distribution Amplifier

(1) Requirements

- (a) It shall be to distributed the video to several circuits, and its input circuit should be high impedance bridge type.
- (b) It shall be made as plug-in type for the effective utilization of rack space and easy maintenance, and six of it can be set parallel in the standard shelf.
- (c) It shall be satisfied with the following performances.

(2) Performances

(a) Ratings

- 1) Power Source : AC100V 50 c/s
- 2) Input Impedance : High impedance (Bridge connection can be available)
- 3) Input Signal : video signal, non composite 1.0V (p-p) or composite 1.4V (p-p)
- 4) Number of Output Circuit : 3 for each distribution unit.
- 5) Output Impedance : 75 ohms
- 6) Output Signal : same to input signal
- 7) Operation : continuous

(b) Characteristics

- 1) Gain Control Range : ± 3 db
- 2) Frequency Characteristics
 - 50 c/s -- 8 Mc/s : Within 1 db
 - Out Side of above frequency Range : Slow roll-off

3) Distortion

Distortion of output signal is, corresponding to the 60 c/s, 15 KC and 250 KC square wave input, as follows:

Frequency	60 c/s	15 KC, 250 KC
Rise time		less than 0.05 μ s
Over sheet		less than 3%
Sag	less than 1%	

4) Lineality

4-1 Differential gain : 0.3%

4-2 Differential phase : Below 0.3° (3.58 MC/S)

5) Transient Response Characteristics of Low Frequency

In case one voltage of step voltage is inserted into the input, overshoot of the output shall be below 20%, and output voltage shall not reach to zero volt within two second.

In case, six numbers of the above equipments are connected in series, the overshoot shall be below 45%.

6) Cross Talk between

Output Terminals : Less than -54 db at 100 Kc/s
-40 db at 3 MC

7) Noise

Less than 1 mV(p-p), when input is terminated with 75 ohms resistor.

8) Allowable power source voltage

variation : $\pm 5\%$

(9) Stabilizing Amplifier

(1) Requirements

(a) It shall have functions as follows;

to eliminate hums and other noises contained in the video signal,
to take out non composite video signal or sync signal from composite
signal, to make composite video signal by mixing them.

(b) Output video signal level, sync level and set up level shall be
remotely controlled from the remote control panel.

(c) The stabilizing Amplifier consists of as follows:

1. Video Gain Control Unit	1
2. Clamper Unit	1
3. Output Amplifier	1
4. Sync Separator Unit	1
5. Sync Gain Control Unit	1
6. Regulator Unit	2
7. Rectifier Unit	1
8. Dummy Unit	3
9. Shelf	1
10. Remot Control Panel	1

(d) The equipment shall easily convert to Color Stabilizing Amplifier
with additional units in anticipation of Color TV Broadcasting
in future.

(e) It shall be rack mount construction.

(f) It shall be satisfied with the following performances.

(2) Performances

(a) Ratings

1) Operation : continuous

- 2) Input Power : AC 100-115V, single phase 50c/s
- 3) Input Impedance
 Video input impedance: high impedance (capable of bridging)
 Mixed Sync. input impedance : high impedance (capable of bridging)
 Blanking input impedance : high impedances (capable of bridging)
- 4) Input Signal : composite 1.4V(p-p), white
 positive or non-composite 1.0V
 (p-p), white positive
 Sync. signal : 4V(p-p), negative
 Blanking signal : 4V(p-p), negative
- 5) Number of Output
 Video output : 3
 Mixed Sync. output : 1
- 6) Output Impedance
 Video output impedance : 75 ohms
 (termination impedance : 75 ohms)
 Sync. output impedance : 75 ohms (termination impedance : 75 ohms)
- 7) Output Signal
 Video signal : composite 1.4V(p-p), white positive, or
 non-composite 1.0V(p-p), white positive,
 (capable of mixing with a sync. signal to
 each of the 3 outputs)
 Sync. signal : 4V(p-p), negative

(b) Characteristics

1) Minimum Limit of Input Signals

Video input signal : Video component 0V(p-p)
Sync component 0.1V(p-p)

Sync. input signal : 2V(p-p)

Blanking input signal : 2V(p-p)

2) Maximum Limit of Output Signals

Video signal : 2.0V(p-p) (confined to composite signals)

Sync. signal : 5.0V(p-p)

3) Frequency Response

50c/s - 8Mc/s : Within 1 db

Outsides of above frequency range : Slow roll off

4) Waveform Distortion

The waveform distortion of output signals corresponding to 60 c/s, 15 KC and 250 KC input rectangular waves are as follows.

	60 c/s	15Kc or 250 Kc
Rise time		less than 0.05 μ s
Overshoot		less than 5%
Sag	less than 1% after the final clamp	

5) Noise

The output noise level is less than 1 mV(p-p) when input is terminated with 75 ohms, the leakage of clamp pulses is less than 20 mV(p-p).

6) Hum suppression factor: Above 27 db

7) Clip level

(1) Black :

Video direction from pedestal: 0 - 0.3V(p-p)

Sync. direction from pedestal: 0 - 0.1V(p-p)

(2) White : 0.8 - 1.6V(p-p)

8) Sync. circuit

The wave form distortion for the input signal of the standard sync. signal is as follows.

Rise Time	Over shoot	Sag (including H/V)
less than 0.19 μ s	less than 2%	less than 1%

9) Linearity

Measured by dummy signal, linearity shall be less than 1% upto 1.4V p-p.

10) Transient Response Characteristics of Low Frequency

In case one voltage of step voltage is inserted into the input, overshoot of the output shall be below 20%, and output voltage shall not reach to zero volt within two second.

11) Cross Talk (Isolation between two output Terminals)

100 KC : Less than -45 db

3 MC : Less than -35 db

(10) Video Switching Equipment for Studio sub control room

(1) Requirements

1. Not only mixing and switching of any two circuits which have been selected among a number of input circuits, but also instantaneous switching of video and preview monitor signals can be remote-controlled.
2. Relays of special construction with contacts made of alloy of gold, silver, and platinum are incorporated. This extremely stabilizes the operation of the equipment on one hand, and eliminates the possibility of occurrence of crosstalk between any two circuits on the other.
3. A special non-break switching system incorporating the combination of relays and semi-conductors has been adopted for all switching operation between send-out signals, providing smooth switching operation.
4. The video switching panel can be remote-controlled from the control console. This eliminates the necessity of leading the input signals into the control console.
5. The relay panel is provided with a dust cover of perfect construction, thus stabilized operation being guaranteed for a long period of time. This cover can be readily mounted or removed for ease of adjustment and repair of relays.

6. Any of the monitor signal line, the sent-out line, and the two effect lines accommodates non-composite (containing no synchronizing signals) input circuits with the result that various operations for fad, lap, etc. can be performed by means of the fader on the control panel.
7. Signals whose sync. signal frequencies are slightly different each other (for example, remote pickup signals) can be connected up to a maximum of three circuits, each circuit being capable of providing smooth automatic fad switching by employing a special circuit with a slow acting relay.
8. The pilot lamp housed in the cap of each push-button switch on the control panel is lit only after the relays interlocked with said push button have been operated completely, there being no apprehension that the present equipment may be erroneously operated. It is also possible to provide "ON AIR" indication on TV equipment associated with the present video switching equipment as required by the operation of the push-button switch.

(2) Performance

INPUT SIDE	Input impedance	Video signal input impedance: High impedance (To be terminated with 75-ohm plugs at as close a location as practicable from the output terminals on the video switching panel.)
	Input signal polarity	Video signal : Positive Sync signal: Negative
	Input signal amplitude	Video signal : 1.4V (P-P) in case of the composite signal of video signal amplitude is 1V (P-P) while sync. signal amplitude is 0.4V (P-P)
		Composite signal: 3 circuits Video signal comprising no sync. signal: 7 circuits
OUTPUT SIDE	Load impedance	75 ohms
	Polarity of output signal	Positive
	Output signal amplitude	1.4V (P-P) in case of the composite signal of which video signal amplitude is 1V (P-P) while sync. signal amplitude is 0.4V (P-P) when no sync. signal is contained
	Number of output signal circuits	Send out circuits) Preview monitor circuits) Each two
CHARACT- TERISTICS	Frequency response	Flat within ± 1 db in a frequency range 60c/s - 8Mc/s. (where any one input is connected to the two output lines).
	Square wave characteristics	Sag is within 2 percent for 60 cps square wave

	Noise	Lower than -60 db
	Crosstalk	Lower than -45 db at 5 Mc/s
POWER SUPPLIES AND POWER CONSUMPTION	A.C.	100V/200V, 50 cps.
	D.C.	24V, maximum current is about 1.5A

(11) Video Switching Equipment for master control room

(1) Requirements

- (a) It shall be remotely operative switching facility.
- (b) Basic composition shall be relay board, control pane and regulated power supply.
- (c) The system shall be the one shown in Fig. 1.
- (d) Lap-time or Gap-time during video switching operation shall be very short (approx. 1 - 1.5 ms)
- (e) It shall be satisfied with the following performances.

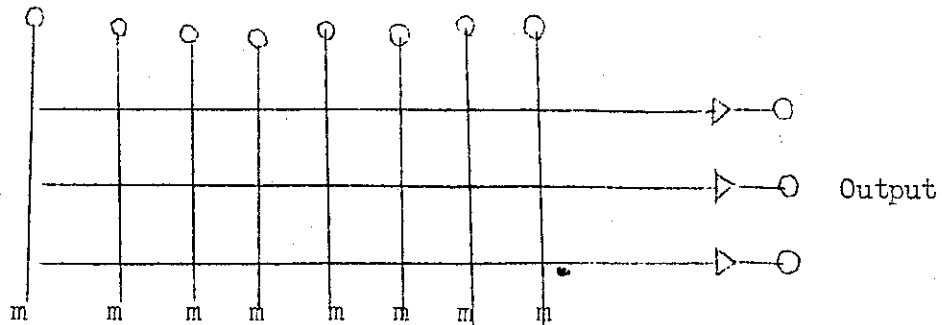


Fig. 1. System

(2) Performances

(a) Ratings

- 1) Operation: Continuous
- 2) Input Power: AC 100/200V single phase 50 c/s
DC 24V 1A
- 3) Input Impedance: 75 ohms $\pm 2\%$
- 4) Number of Input Circuit: 8
- 5) Input Signal,
 - Video Input: 1V (p-p)
 - (non-composite) White
 - Video Input: 1.4 (p-p)
 - (composite) White positive

6) Output Signal (Relay board only)

Video Output: 1V (p-p)
(non-composite) White
Video Output: 1.4V (p-p)
(composite) White positive

7) Number of Output Circuits

(Relay Board): 3

(b) Specifications

- 1) Range of Gain Variation: 0.9 - 1.1V (p-p) (Relay Board only)
- 2) Frequency Characteristics: 60 c/s - 8MC ± 1 db (max.)
of video section (Relay Board only)
60 c/s - 7MC ± 1 db (max.)
(overall)
- 3) Waveform Distortion: Rise time: less than 0.08 μ s
(250Kc Sq. Wave)
Over shoot: less than 10%
Sag: less than 2% (at 60c/s)
- 4) Linearity: Within $\pm 2\%$ at rated output
- 5) Cross Talk of Input: More than 45 db at 5 Mc
Circuit
- 6) Noise: Less than 1 mV (p-p)
(Non synchronizing components)
Less than 30mV (p-p)
(Synchronizing component)
- 7) Tolerable Line Voltage
Fluctuation: $\pm 5\%$

(12) VIDEO SIGNAL SWITCHING EQUIP. FOR SUB CONTROL ROOM

(1) General

This switcher is a remote-control signal switching equipment used principally at the sub-control room of a television broadcast station for switching and control of the video signal. The switchings and controls of the video signal are all accomplished through relay-switching operation of a switching panel which is interlocked with push-button switches and a control panel with a fader.

(2) Requirements

- 2.1 The equipment enables the operator to remotely control all operations such as selection of any two circuits among many input circuits, mixing and switching between these selected circuits, and instantaneous switching of the send-out signals.
- 2.2 The equipment secures stable and dependable operations and is free from cross-talks which might exist between the equipment and other circuits through the use of relays which have special construction employing contacts made of an alloy of gold, silver and platinum.
- 2.3 Switching of the send-out signals is accomplished smoothly because of a special non-break switching system adopted, in which the switching of the send-out signals are all performed in combination with their associated semiconductors.
- 2.4 Since the signal switching panel used for switching of video signal may be remotely controlled from a control console, there is no need to supply the input signal to the console.

- 2.5 All relays are guaranteed for their stable operations over a long time by employing complete dust-covers over them. The covers are made convenient for adjustments and repairs because of their constructions which allows easy installation and removal of them to the equipment.
- 2.6 In addition to instantaneous switching of the input signal by means of the push-buttons, the equipment is able to perform such operations as fade trap and others by means of the fader on the control panel.
- 2.7 As the switching indicator lamps inside the caps of push-button switches in the control panel are lighted only after the relays interlocked with the push-buttons have been operated completely, no miss-operation is resulted. Following to this operation, on-air indications may be displayed on the units which requires such indication.

(3) Characteristic

3.1 Input (Video signal)

Input Impedance: High impedance (But it is desirable to terminate to 75 ohms at short distance, if possible)

Polarity of Input Signal: Positive

Amplitude of Input Signal: 1 volts (p-p)

Number of Input Signal: 5

3.2 Output

Load Impedance: Matching to 75ohms load

Polarity of Output Signal: Positive

Amplitude of Output Signal: 0.8 volt (p-p)

Number of Output Signal: 2 for sending out to lines

3.3 Characteristics

Frequency Response:	Within 60 cps to 8 mc ± 1 db (where any one input from two input lines is connected to the equipment.)
Rectangular Wave Characteristic:	Within a sag of 2% for 60 cps rectangular wave
Noise:	Less than -60 db
Crosstalk:	Less than -45 db at 5 mc

3.4 Power Supplies required

- A.C. 100 or 200 volts, 50 cps. About 20 VA
- D.C. 24 volts, with maximum current draw of about 1 ampere.
- A.C. 100 or 200 volts, 50 cps. About 100 VA

(13) Video Mixing Amplifier

(1) Requirements

- (a) This equipment shall be used as a part of the Video Switching equipment to produce various video effects such as mixing, fade-in and fade-out required to the television programs.
- (b) The amplifier shall be made as plug-in type, and be controlled remotely by a fader.
- (c) Cut off point and gain shall be remotely controlled.
- (d) It shall be satisfied with the following performances.
- (e) The equipment shall be all transistorized.

(2) Performances

(a) Ratings

- 1) Operation : Continuous
- 2) Power Source : AC 100-115 200-230V single phase 50 c/s
- 3) Input Impedance : Video : 75 ohms
sync. : high impedance
- 4) Input Signal : video : 1.0V (p-p) white-positive (non-composite)
Sync. : 4.0V(p-p) negative
- 5) Number of Output Circuit : video : 3
- 6) Output Impedance Video : video : 75 ohms

- 7) Output Signal : video : 1.4V (p-p) white-positive (composite)
 or 1.0V (p-p) white-positive (non-composite)

(Synchronization signal and setup signal can be mixed to each of three output independently)

(b) Characteristics

1) Maximum Value of Output Signal

Video signal : 2.0V (p-p) (composite)

2) Sync. output: : 0.2 - 0.6V variable

Setup : 0.05 - 0.2V "

3) Frequency Response

50 c/s - 8Mc : Within 1 db

Outsides of above frequency range slow roll off.

4) Waveform Distortion

Distortion of output signal for the 60c/s, 15KC and 250KC square wave input is:

	60 c/s	15KC, 250KC
Rise time		less than 0.05 μ s
Overshoot		less than 3%
Sag	less than 1% after clamping	

5) Lineality : DG 0.5%

DP 0.5%

6) Cross Talk (Isolation between two output terminals)

100 Kc/s Below -54 db

3 Mc/s Below -40 db

7) Noise

The output noise level is less than 1 mV (p-p), when input terminated with 75 ohms. The leakage of the clamping pulse is less than 30 mV.

8) Ambient Temperature: 0 - 40°C

(14) Master Monitor

(1) Requirements

- (a) It shall be used for monitoring the picture quality, waveform of a video signal and signal level.
- (b) It shall be enclosed in a carrying case for field use and in consol-housing for studio use.
- (c) D.C. Inersion at Picture both Monitor Part and Wave Part shall be by Pedestal Clump method.
- (d) Composite sync. pulses shall be observed by a pulse cross operation.
- (e) External input synchronizing pulses shall be operated both mixed sync. signal and horizontal, vertical drive signal.

(2) Performances

(a) Ratings

1) Input Signals

Video (Composite)	:	1.4V (p-p) White positive
Video (Non Composite)	:	1.0V (p-p) White positive
Composite Sync. Pulse	:	4.0V (p-p) Negative
Horizontal Drive Pulse	:	4.0V (p-p) Negative
Vertical Drive Pulse	:	4.0V (p-p) Negative

2) Input Impedance

Video	:	High Impedance
Composite Sync. Pulse	:	High Impedance
Drive Pulses	:	75 ohms

(b) Characteristics

1) Frequency Response

Picture Monitor Video

Amplifier : 30 c/s - 8 MC,
within ± 1.0 db

Waveform Monitor Video Amplifier

Wide Band : 60 c/s - 4.0 MC,
within ± 0.5 db

Narrow Band : IRE Standard roll off
characteristic

2) Phase Characteristics

Picture Monitor Video

Amplifier : 60 c/s Square Wave
Distortion; within
 $\pm 5\%$ tilt

Waveform Monitor Vide

Amplifier : 60 c/s Square Wave
Distortion; within
 $\pm 2\%$ tilt

3) Picture Monitor

Geometric Distortion : within 2% for RETMA
chart

(15) Synchronizing Signal Generator

(1) Requirements

This equipment generates standard synchronizing and blanking signals, horizontal and vertical driving signal to drive the units such as camera, etc. and grid and dot signals to test the deflection circuit of camera, monitor and so on.

(2) Construction

This equipment is composed of the following units, all of which are mounted on one shelf.

- 1) Synchronizing Signal Generator
 - a) Main Oscillator
 - b) Frequency Multiplier unit
 - c) Wave Form Shapint unit
- 2) Grating and Dot Signal Generator
- 3) Synchronous Coupler
- 4) Power Supply

(3) Ratings

3.1 Input Level

3.1.1 "External Input" Level 31.25 KC 2 - 10(p-p)

3.2 Output Level

3.2.1 Combined Synchronizing Signal	4V(p-p)	Negative
3.2.2 Combined Blanking Signal	4V(p-p)	Negative
3.2.3 Horizontal Driving Signal	4V(p-p)	"
3.2.4 Vertical Driving Signal	4V(p-p)	"
3.2.5 Grid and Dot Signal	4V(p-p)	"

3.3 Input Impedance

3.3.1 External Input 31.25 KC High Impedance

3.4 Load Impedance 75 ohms

3.5 Power Supply

Single Phase, AC 100V/200V 50 c/s

(4) Performance

4.1 General Description

The electrical performance specified in paragraph 4.2 must be satisfied and further the performance should be stabilized when the power supply voltage fluctuation by $\pm 5\%$ against the rated value and the ambient temperature changes from 0°C to 50°C .

4.2 Electrical Performance

4.2.1 Tolerance of oscillation frequency by crystal oscillator and fluctuation

- 1) Standard Frequency 31,250.00 c/s
- 2) Tolerance of Frequency $\pm 5 \times 10^{-5}$ against the specified value

3) Fluctuation of Frequency

Fluctuation of frequency should be with $\pm 3 \times 10^{-5}$ against the specified value for 6 hours under the change of the ambient temperature from 0°C to 50°C .

4) External signal frequency: 31,250.00 c/s

4.2.2 Output signal waveforms

	Synchronizing Signal			Blanking Signal		Horizontal Driving Signal	Vertical Driving Signal
	Horizontal Synchronizing	Serrated Vertical Synchronizing	Equalizing pulse	Horizontal	Vertical		
Pulse width	0.08H	0.07H	0.04H	0.167H	20H	0.08H	7.5H
Tolerance for the above	$\pm 0.002H$	$\pm 0.002H$	$\pm 0.002H$	$\pm 0.005H$	$\pm 2H$	$\pm 0.004H$	$\pm 0.5H$
Phase of the front edge	0	-	0	0.025H	3.025H	Same as the Blanking signal	
Tolerance for the above	-	-	-	$\pm 0.002H$	$\pm 0.002H$		
Variable region of pulse length	0	0	0	0	0	0.05 0.11H	0
Rise time	Less than 0.19 μs			Less than 0.19 μs	Less than 0.6 μs	Less than 0.19 μs	Less than 0.6 μs
Overshoot	Less than 2%						
Sag	Less than 1%						

Note (1) The pulse length and the phase of the front edge specify the following part of the output signal wave form.

Synchronizing Driving Signal ... 10% point of total amplitude

Blanking Signal 90% point of total amplitude

(2) "The Phase of the front edge" means the phase difference from the front edge of the Horizontal or Vertical sync signal wave form.

4.2.3 Tolerance of Output Level

$$4 \pm \frac{1}{0} \text{ V(p-p)}$$

4.2.4 Noises in the Output Level

1) Hum Noise

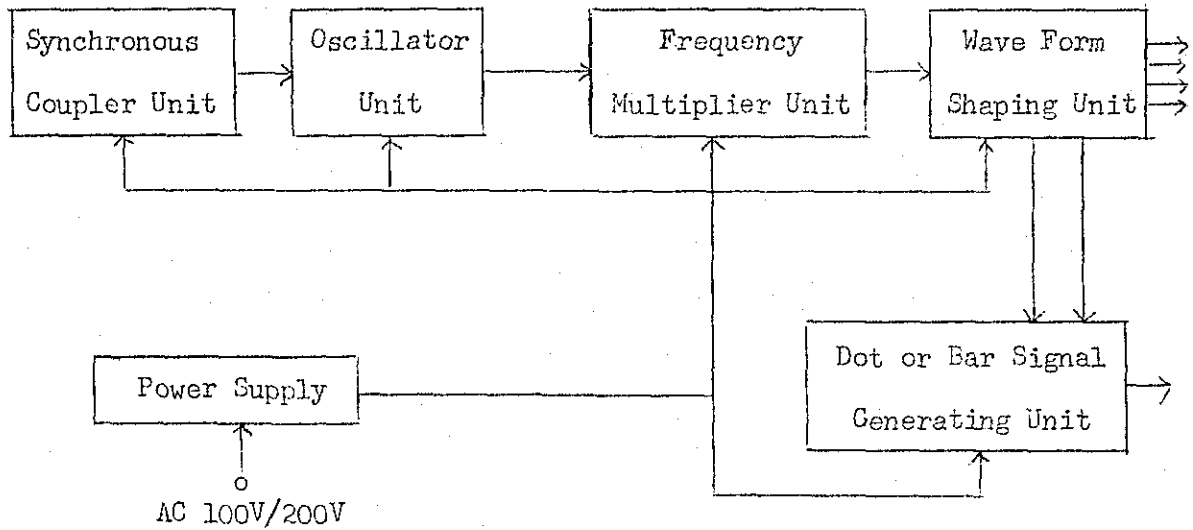
Less than -60 db against the output level

2) Synchronous Noise

Less than -40 db against the output level

4.2.5 Synchronizable frequency in case of power supply synchronization

50 ±1 c/s



System Diagram of Synchronizing Signal Generator Equipment

(16) Pulse Change-Over Equipment

(1) Requirements

- (a) It shall be suitable to be used with two synchronizing pulse generators specified in this specification for switching the output pulse and for selecting and controlling operation mode.
- (b) Above mentioned operations, switching, selecting and controlling, shall be done remotely by master control console.
- (c) It shall consist of a relay panel and a remote control panel. The relay panel shall be mounted on equipment rack and remote control panel shall be mounted on master control console.
- (d) The remote control panel chassis shall be a standard panel type, and can be mounted in a standard console housing.
- (e) The pulse switch and its remote control panel include the tally lamp circuit indicating the change-over operation.
- (f) It shall be satisfied with the following performances.
- (g) It shall provide necessary tally lamp circuit for switching conditions of operation.

(2) Performances

Ratings

1) Pulse Switcher

- (1) Switcher for remote synchronizing pulses

Inputs : 4 circuits for remote synchronizing pulses.

Outputs : 2 circuit which feed two synchronizing pulse generators respectively.

- (2) Switcher for two synchronizing pulse generators

Inputs : 2 groups*, each having 5 kinds of pulses
from the synchronizing pulse generators.

Outputs : 2 groups**, each having 6 circuits for the
whole station.
load impedance ; high

* Kinds of input signals

- (1) Mixed synchronizing pulse
- (2) Blanking pulse
- (3) Vertical drive pulse
- (4) Horizontal drive pulse
- (5) Grating signal

** There is provision for feeding through the standby generator signals to permit the simultaneous use of these signals elsewhere in the station, if desired.

2) Synchronizing Pulse

Remote control pannel

- (1) Remote control circuits for remote-sync. switcher

Inputs : 5 circuits including a reset button

Outputs : 2 circuits for each input.

- (2) Change-over circuit for synchronizing pulse generators.

6 change-over relays on the pulse switcher are controlled by a toggle switch on the remote control pannel.

- (3) Power Requirement : 24 Volts, DC, 0.9 Ampere

(17) Pulse Distribution Amplifier

(1) Requirements

- (a) It shall be suitable to be used for distribution of synchronizing pulses.
- (b) It shall be constructed a number of distribution amplifier unit, power rectifier unit, power regulator unit and mounting shelf. Each unit shall be plug-in type mounted on the shelf, and the shelf shall be mounted on equipment rack.
- (c) It shall be all transistorized.
- (d) It shall be satisfied with the following performances.

(2) Performances

(a) Ratings

- 1. Distribution Amplifier unit
 - 1.1 Input Impedance : high impedance (Bridging)
 - 1.2 Input Signal : Horizontal and vertical driving pulses, blanking pulse and synchronizing pulse.
 - 1.3 Input signal Amplitude : 2-3V (p-p) (negative)
 - 1.4 Number of Output Signals : 3 for each Sync. Dist unit
 - 1.5 Output Impedance : 75 ohms
 - 1.6 Output Signal Amplitude : 4V (p-p) (negative)
- 2. Power rectifier and regulator unit
 - 2.1 Input : AC 100/200V 50 c/s
 - 2.2 Output : shall be enough to supply 1 to 8 distribution amplifier unit
- 3. Mounting shelf : shall be able to mount 1 to 8 units of distribution amplifier unit, a

power rectifier unit and a
power regulator unit.

(b) Characteristics

1) Output Signal

Waveforms

Rise time : less than 0.25 μ s

Sag : less than 3%

Over shoot : less than 3%

2) Noise

hum noise : less than 4mV (p-p)

pulse noise : less than 40mV (p-p)

3) Allowable Power Source

Variation : 5%

(18) Microphone

(A) Velocity Microphone

Characteristics

- 1) Impedance : 600 ohms $\pm 20\%$
- 2) Output level : above -75dB
- 3) Frequency Response : within ± 3 dB from 50 cps to
15,000 cps
- 4) Directional Characteristic : Bi - directional

(B) Ribbon Microphone

Characteristics

- 1) Impedance : 600 ohms $\pm 20\%$
- 2) Output level : above -75dB
- 3) Frequency Response : within ± 3 dB from 50 cps to
15,000 pes
- 4) Directional Characteristic : Variable directional

Remarks: Output level was measured at 0dB = 1V/u bar, 1,000 cps

(19) Program Monitor

(1) Requirements

- (a) It shall be Plug-in Unit.
- (b) Shall provide the built-in power sources.
- (c) Shall be 8W at maximum output.

(2) Performances

(a) Ratings

- 1) Input Impedance : 600 ohms and 10K ohms balanced
- 2) Output load Impedance : 600/300/150/75/15 ohms
- 3) Gain : 77 db
- 4) Maximum output level : +39 dbm
- 5) Power Supply : AC 100/200V, 50 cps,
single phase
- 6) Ambient temperature : 0 - 50°C

(b) Characteristics

- 1) Frequency Response : within ± 1 db from 30 to 15,000 cps
referred to 1,000 cps
- 2) Distortion : less than 3% at maximum output
level
- 3) S/N. : more than 50db at -65dbm input

(20) Audio Control Console

(1) Requirements

- a) The amplifier, power supply, etc. shall be plug-in-unit type, and shall be built-in the console.
- b) Audio control console shall be all transistorized.
- c) The program circuits shall provide a vertical fader for volume control.

(2) Performances

(a) Ratings

- 1) Number of Input and Output: as appointed
- 2) Input Impedance: 600 ohms
- 3) Output load Impedance: 600 ohms
- 4) Input level: microphone -72 dbm
(-32 dbm max.)

-22 dbm
(-7 dbm max.)
- 5) Output level: program +6 dbm (+21 dbm max.)
Monitor +28 dbm (+38 dbm max.)
-22 dbm (-7 dbm max.)
- 6) Power Supply AC 100/200 V, 50 cps single phase

(b) Characteristics

1) Frequency Response

- Program: within ± 1 db from 30 cps to 15,000 cps
referred to 1,000 cps
- Monitor: within ± 1.5 db from 30 cps to 15,000 cps
referred to 1,000 cps

2) Distortion (maximum output level)

Program: less than 0.75% from 100 cps to 10,000 cps,
less than 1.0% from 50 cps to 15,000 cps

Monitor: less than 3.0% from 50 cps to 15,000 cps

3) S/N: more than 50 db at -72 dbm microphone input

(21) 3 Speed Disk Reproducer

(1) Requirements

- (a) It shall be for three speeds (78, 45 and 33 1/3 RPM)
- (b) Shall provide 2 tone arms. (for LP and SP)
- (c) Shall be available for 16" playing record.
- (d) Shall provide an amplifier and an equalizer.

(2) Performances

(a) Ratings

- 1) Power supply: AC 100V 50 cps single phase
- 2) Turntable Speed: 78, 45 and 33 1/3 RPM.
- 3) Turntable diameter: 14"
- 4) Output: 600 ohms, -20 dbm/+4 dbm

(b) Characteristics

- 1) Overall frequency response: Reproducible 50 to 10,000 cps.
- 2) Flutter and Wow: less than 0.2% rms.
- 3) Noise: more than 40 db against program level (1,000 cps 50mm/sec.) including mechanical rumble.

(22) Tape Recorder

(1) Requirements

- (a) It shall be for two-speeds. (7.5, 15 ips)
- (b) Shall be available for 11 1/2" reel.
- (c) Shall control the start/stop remotely.
- (d) Shall provide a monitor amplifier and a monitor speaker.

(2) Performances

(a) Ratings

- 1) Power Supply: AC 100V, 50 cps single phase
- 2) Tape Speed: 7.5, 15 ips
- 3) Input: 600 ohms, -20 dbm (min)
- 4) Output: 600 ohms, +14 dbm (max)

(b) Characteristics

- 1) Tape speed accuracy: within $\pm 0.2\%$
- 2) Frequency Response: 7.5 ips. within ± 1 db from 100 cps
to 5,000 cps
within ± 2 db from 50 cps
to 10,000 cps

15 ips. within ± 1 db from 100 cps
to 7,500 cps
within ± 2 db from 50 cps
to 15,000 cps

3) Flutter and Wow:

7.5 ips within 0.07% rms.

15 ips within 0.1% rms.

4) Distortion:

less than 1% against operating level
and less than 3% against peak recording
level both at 1,000 cps.

(23) Call Sign Machine

(1) Requirements

Shall be available for tape-recording the announcement of/within 5 minutes, and for reproducing the announcement repeatedly by means of the endless tape, shall be automatically stopped after making one round of the endless tape, and shall be provided with the start/stop control remotely.

(2) Performances

(a) Ratings

- 1) Power Supply: AC 100V 50 cps. single phase
- 2) Tape Speed: 9.5 cm/s

(b) Characteristics

- 1) Overall frequency Response: within ± 1 db from 300 cps
to 3,000 cps
- 2) S/N: more than 40 db, in cast tape-recording the audio signal of the input level -55 db at 1,000 cps in the operating level, and reproducing it to the output level +10 dbm.
- 3) Distortion: less than 8%, same condition with 2.

(24) Lighting Equipment for Studio

Requirements

- (a) Illumination of the order of 100-150 foot candles shall be required for a TV Studio.
- (b) Lighting shall be remote controlled by the dimmer transformer.
- (c) Shall provide a baton so as to enable the lighting equipment up-to-down movement.
- (d) Shall be available for selecting and switching over one light to the other through lighting patch board and lighting switching board.
- (e) Total number of the lighting equipment is as per below:

Equipment	Q'ty	
	3000 FT ² STUDIO	2000 FT ² STUDIO
Lighting Baton	22	16
Main switch board	1 (90KVA)	1 (75KVA)
Switch board	1 (100GCT)	1 (70GCT)
Dimmer trans	3	3
Dimmer control panel	1	1
500W Solar Spot light	6	5
1000W "	12	10
2000W "	5	3

Equipment	Q'ty	
	3000 FT ² STUDIO	2000 FT ² STUDIO
1000W Scoop Light	23	20
500W "	17	15
Bank Light (150W x 6)	10	10
Strip Light (100W x 8)	8	5
Strip Light (100W x 4)	5	3
Spring Ballanced Hanger	10	5
Hanger	70	60
High Stand	3	3
Extension Cord (10M)	7	5
" (5M)	5	3
Patch Cord	7	5

Ref. Lighting Equipment shall be included value, 5 meter cord, plug and 200% spare value.

(25) Image Orthicon Camera Equipment

(1) Requirements

- (a) The equipment shall be portable type and be suitable for either studio or field use.
- (b) The equipment shall be used 4 1/2 inch image orthicon tube.
- (c) The circuits shall be transistorized except for high voltage rectifier and corona voltage regulator.
- (d) The main part of each circuit shall be a plug in type unit, and the following units shall be interchangeable.
 - (d1) Horizontal deflection unit, for camera and viewfinder.
 - (d2) Vertical deflection unit for camera and viewfinder.
- (e) A large picture tube having diagonal of more than 8 inch shall be provided for viewfinder.
- (f) Camera cable shall be capable of extending up to 300 meter (1,000 ft)
- (g) The equipment shall be operated system sync and blanking inputs only. H and V drive pulses must be generated within the equipment.
- (h) The equipment can be operated in non-synchronous to the power source.

(2) Performances

It must be satisfied with the following performances.

(a) Ratings

1) Power Input

- 1.1 Line Voltage : AC 80-130 volts, or AC180-230 volts
- 1.2 Line Frequency : 50 c/s
- 1.3 Power Consumption : Less than 1,000 VA except for control monitor

2) Input Signals

- 2.1 Sync : 2-6 volts (p-p) negative
2.2 Blanking : 2-6 volts (p-p) negative
2.3 Input Impedance : Changeable for 75 ohms and high impedance (bridge connection is available)

3) Output Signals

- 3.1 Video Outputs : 3 outputs, either 1.4/10 volts (p-p) composite, or 1.0/0.7, volts (p-p) non-composite
3.2 Output Impedance : 75 ohms

(b) Characteristics

1) Resolution :

Amplitude response at 400 TV lines (per-cent of large-area black to large-area white)

more than 65% at center of picture

more than 55% at corner of picture

(In other words, resolution

more than 700 TV lines at center

more than 500 TV lines at corner)

- 2) Frequency Response : ± 1.0 db up to 7MC

- 3) Signal-to-Noise Ratio :

3.1 More than 42 db p-p signal/rms random noise for bandwidth of 7 MC

3.2 More than 60 db p-p signal/p-p hum noise

- 4) Geometric Distortion : Within $\pm 1\%$ of picture height at center, $\pm 2\%$ at corner

- 5) Gamma Correction : Switchable to three preset values, 0.65, 0.80 and 1.0

- 6) Aperture Correction : Amplitude continuously adjustable
from 0 to 10 db boost at 6.5 MC

(c) Mechanical Specifications

- 1) The equipment shall consist of Camera Head, Camera Control Unit and Camera Power Supply, and the dimension and weight of each unit shall be smaller and lighter than that of the following table.

	Height	Width	Depth	Weight
Camera Head	380 mm	280 mm	630 mm	50 kg
Camera Control Unit	170 mm	410 mm	260 mm	15 kg
Camera Power Supply	410 mm	235 mm	560 mm	45 kg

Note : Above mentioned dimensions and weights are not included lenses, nortable handle etc.

- 2) Image orthicon tube and its yoke assembly can easily be installed or removed from the front side of camera head.
- 3) Optical focus shall be accomplished by moving the yoke assembly along its own axis so as to give a cosine motion by focus knob.
- 4) Lens turret can be accomodated four TV lenses of different focal length.
- 5) The height of tripod with dolly shall be variable between approx. 670 mm and approx. 930 mm from floor.
- 6) The height of camera pedestal (without cradle head) shall be adjustable between approx. 900 mm and approx. 1,350 mm from floor.

(26) Vidicon Camera Equipment (Live)

(1) Requirements

- (a) It shall be Vidicon Camera for both studio and telecine use.
- (b) The equipment can be operated in non-synchronous to the power source.
- (c) This equipment shall consist of camera head (including electronic viewfinder) camera control unit, and camera power supply.
- (d) Camera head shall be provided with four position lens turret and focusing adjuster, so that suitable lens and focus can be adjusted smoothly. Screen size of view finder shall be 90 mm x 120 mm.
- (e) The circuit shall be transistorized as far as possible to make the equipment small size, light weight and low power consumption.
- (f) Camera head shall be connected to camera control unit with one piece of 18 core camera cable.
- (g) The equipment shall have protection circuit, ie when horizontal or vertical deflection is failed, beam of vidicon shall be cut off by the circuit in order to protect the vidicon tube from damage.
- (h) Printed circuit shall be used and can be changed easily by plug-in method.
- (i) Cine mount lenses and zoom lens of 25mm - 100mm can be adaptable. When zoom lens is applied, zooming and focusing can be easily operated at rear side of camera head.
- (j) Horizontal and vertical scanning direction shall be reversed easily by a switch.
- (k) Camera control shall be capable of controlling sawtooth and parabola shading of both horizontal and vertical scanning rate.

- (l) Correction circuit shall be provided.
- (m) Camera head shall have the switches by which scanning direction of both horizontal and vertical shall be reversed independently.

(2) Performances

It must be satisfied with the following performances.

(a) Ratings

1) Power Input

- 1.1 Line Voltage : AC 100 volts or AC 200 volts
- 1.2 Line Frequency : 50 c/s
- 1.3 Power Consumption : Less than 190 VA except for optional picture and waveform monitor

2) Input Signals

- 2.1 Sync : 2 -- 6 volts (p-p): negative
- 2.2 Blanking : 2 -- 6 volts (p-p) negative
- 2.3 Input Impedance : Changeable for 75 ohms and high impedance (bridge connection is available.)

3) Output Signals

- 3.1 Video Outputs : 2 outputs, either 1.4/1.0 volts (p-p) composite, or 1.0/0.7 volts (p-p) non-composite
- 3.2 Output Impedance : 75 ohms

(b) Characteristics

1) Resolution

- 1.1 Amplitude response at 400 TV lines (per-cent to large-area black to large-area white)
 - more than 30% at center of picture
 - more than 20% at corner of picturewithout aperture correction

- 1.2 When the aperture correction is applied, those amplitude response at center of picture is more than 70% at 400 TV lines.
- 2) Frequency Response : ± 1 db up to 7MC
- 3) Signal-to-Noise Ratio
 - 3.1 More than 35 db p-p signal/rms random noise for bandwidth of 7 MC
 - 3.2 More than 60 db p-p signal/p-p hum noise
- 4) Geometric Distortion : Within $\pm 2\%$ of picture height

(27) Vidicon Camera Equipment (Telecine)

(1) Requirements

- (a) The equipment shall be transistorized except for high voltage rectifier and corona voltage regulator.
- (b) The equipment consists of Camera Head and Camera Pedestal, in which Camera control units and power supply units are mounted. So a conventional cabinet rack is not needed.
- (c) The main part of each circuit shall be a plug in type unit for case of maintenance.
- (d) The equipment shall have the function of automatic sensitivity control, automatic set-up level control and automatic gain control.
- (e) The equipment shall have protection circuit, ie when horizontal or vertical deflection is failed, beam of vidicon shall be cut off by the circuit in order to protect vidicon tube from damage.
- (f) The equipment shall be capable of controlling sawtooth and parabola shading of both horizontal and vertical scanning rate.
- (g) Picture and Waveform Monitor shall be mounted in/on the Camera Pedestal optionally.
- (h) Some controls such as "Gain", "Pedestal" etc, shall be able to remotely controlled.
- (i) The height of incident light axis to the Camera.
- (j) The equipment shall be operated system sync and blanking inputs only. H and V drive pulses must be generated within the equipments.
- (k) The equipment can be operated in non-synchronous to the power source.

(2) Performances

It must be satisfied with the following performances.

(a) Ratings

1) Power Input

- 1.1 Line voltage : AC 100 volts or AC 200 volts
- 1.2 Line Frequency : 50 c/s
- 1.3 Power Consumption : Less than 300 VA except for optional picture and waveform Monitor

2) Input Signals

- 2.1 Sync : 2 - 6 volts (p-p) negative
- 2.2 Blanking : 2 - 6 volts (p-p) negative
- 2.3 Input Impedance : Changable for 75 ohms and high impedance (bridge connection is available)

3) Output Signals

- 3.1 Video Output : 3 outputs, either 1.4/1.0 volts (p-p) composite, or 1.0/0.7 volts (p-p) non-composite
- 3.2 Output Impedance : 75 ohms

(b) Characteristics

1) Resolution

- 1.1 Amplitude response at 400 TV lines (per-cent of large-area black to large-area white)

more than 45% at center of picture

more than 30% at corner of picture

Without aperture correction

- 1.2 When the aperture correction is adjusted for optimum performance, those amplitude response at center of picture is more than 90% at 400 TV lines.
- 2) Frequency Response : ± 1 db up to 7 MC
- 3) Signal-to Noise Ratio
- 3.1 More than 35 db p-p signal/rms random noise for bandwidth of 7 MC
- 3.2 More than 60 db p-p signal/p-p hum noise
- 4) Geometric Distortion : Within $\pm 2\%$ of picture height
- 5) Gamma Correction : Switchable to three preset values, 0.7, 1.0 and 1.2
- 6) Aperture Correction : Max. boost more than 12 db at 6 MC

(28) 16 mm Film Projector

(1) General

The specifications stipulate requirements for a 16 mm film projector for use in a CCIR system vidicon camera.

(2) Requirements

- (a) The projector feeds the picture into the CCIR system vidicon camera and permits voice reproduction by magnetic or optical means. (Both magnetic and optical unit for the voice reproduction system.)
- (b) Single-frame stop without changing light and color temperature.
- (c) Automatic light control (videcon camera may be combined)
- (d) Automatic projection-lamp change
- (e) Remote control
- (f) Automatic loop setting

(3) Performances

(a) Ratings

- 1) Film : 16 mm (Standard 16 mm film)
- 2) Film capacity : Maximum 4,000 feet
- 3) Image shaft : 1,220 mm from floor level, variable range ± 25 mm
- 4) Shutter opening angle : More than 165°
- 5) Shutter speed : 50 times/second
- 6) Film speed : 25 frames/second
- 7) Pull down system : Regular interval pulling down system
- 8) Start time : Within 0.15 seconds (picture and voice)

- 9) Operation : Continuous
- 10) Ambient temperature : 0° to 45°C
- 11) Projector lens : F = 3.5 f = 135 mm (with diaphragm
of 3.5 to 22)

For color film
F = 2.5 f = 63.5 mm (with diaphragm
of 2.5 to 22)
- 12) Light control : ND filter, continuously variable

with automatic and remote controls

(automatic control within 1 second)
- 13) Voice output level : +4 dbm and -22 dbm
- 14) Voice output impedance : 600 ohms
- 15) Power supply : 100 VAC 50 cps single phase

(b) Characteristics

- 1) Picture vibration : Horizontal 0.15%

Vertical 0.15%
- 2) Illumination intensity
unevenness : More than 90% of the center
intensity
- 3) Light and temperature
variation : No variation in normal projection
and single-frame viewing
- 4) Voice frequency
characteristic : 50 to 7000 cps \pm 2 db with SMPTE
test film
- 5) S/N ratio : Better than 40 db
- 6) Transmission factor : Within 3% with SMPTE test film
- 7) Wow and flutter : Within 0.3%

(4) Accessories

(a) Reel	400 feet	1 ea.
	800 "	1 ea.
	1,600 "	1 ea.
	4,000 "	1 ea.
(b) Projection lamp		6 ea.
(c) Exciter lamp		6 ea.
(d) Mobile oil		1 set
(e) Tool		1 set

(5) Spare parts

(a) Pull down claw		2 ea.
(b) Pull down mechanism		2 sets
(c) Aperture plate		1 ea.
(d) Pressure plate		1 ea.
(e) Heat insulating filter		1 ea.
(f) ND filter		1 set
(g) Reproduction head assembly		1 set
(h) Clutch mechanism		1 set
(i) Rubber drive belt		1 set
(j) Sprocket holding spring		10 ea.
(k) Synchronous motor		1 ea.
(l) Cooling fan motor		1 ea.
(m) Induction motor		1 ea.

(29) Film Projector for Editing

(1) General

The specifications stipulate the requirements for a 16 mm film projector used in TV studio test viewing.

(2) Requirements

- (a) To be used for test purposes and therefore to be of rigid construction and permit easy handling
- (b) Single-frame viewing
- (c) Reverse projection
- (d) Fast rewinding
- (e) Optical and magnetic voice reproduction
- (f) Magnetic recording
- (g) Small and light

(3) Performances

(a) Ratings

- 1) Film : Standard 16 mm film
- 2) Film capacity : Maximum 2,000 feet
- 3) Film speed : 25 ±1 frame per second
- 4) Projection lamp : 750 - 1,000 W
- 5) Projection lens : $F = 1.5$ $f = 50$ mm

- 6) Voice output : Maximum 12W, speaker built-in,
mountable external speaker
- 7) Operation : Continuous
- 8) Power supply : 50 cps, 100 VAC, single phase

(b) Characteristics

- 1) Picture vibration : Horizontal 0.5%
Vertical 0.5%
- 2) Voice reproduction
frequency characteristic: 50 - 7,000 cps, maximum deviation
within 10 db
- 3) S/N ratio : Better than 35 db at 1/2 the
rated output
- 4) Distortion ratio : Within 5% at 1/2 the rated output
- 5) Won and flutter : Within 0.6%
- 6) Brightness of picture : Better than 300 lux on 1 x 0.75 m
screen.

(4) Accessories

- (a) Reel 1,600 feet film capacity 1 ea.
2,000 feet film capacity 1 ea.
- (b) Projection lamp 5 ea.
- (c) Power cable (5 m length) 2 ea.
- (d) Speaker cord (20 m length) 1 ea.
- (e) Screen (1 m x 0.75 m, daylight) 1 ea.

(30) 16 mm Magnetic Film Recorder Reproducer

(1) Requirements

- a) Synchronous type magnetic-recorder/reproducer equipment of movie sound signals using 16 mm magnetic film.
- b) Equipment separated into two units, an amplifier and a mechanical unit, each accommodated in a portable case.
- c) Equipment permitting a maximum of 30 minutes of continuous recording.
- d) Framing adjustment during operation.
- e) Equipment meeting SEPMAG of No.264 and No.265 of CCIR Recommendations.
- f) Regular or reverse rotation possible.
- g) Equipped with a meter to indicate film travel distance.

(2) Performances

2.1 Ratings

- | | |
|-------------------------------|---|
| a) Film used | Standard (long pitch) 16 mm film with holes on one side |
| b) Track | Center track |
| c) Film speed | 25 frames/sec. |
| d) Line input impedance | 600 Ω or 10K Ω , balanced, selectable |
| e) Line input level | -20 dbm |
| f) Microphone input level | 600 Ω or 250 Ω , balanced, selectable |
| g) Microphone input impedance | -70 dbm |
| h) Line output impedance | 600 Ω , balanced |
| i) Line output level | -20 dbm or 4 dbm, selectable |
| j) Monitor output | More than +33 dbm |
| k) Power supply | 100 VAC, 50 cps, 210 VA |

2.2 Characteristics

- a) Overall frequency response
 - 100 to 5,000 cps within ± 1 db
 - 50 to 100 cps within + 1 to -4 db
 - 5,000 to 10,000 cps within + 1 to -4 db
- b) Kril factor at 1 kc Less than 2% at operational recording level
- c) S/N ratio More than 48 db at the dynamic recording level of 1 KC rated input and output.
- d) Wow and flutter Less than 0.3% RMS
- e) High speed take-up and rewind time Within 2 minutes for 1200
- f) Build up time Less than 3 sec.
- g) Frame speed Maximum 1.5 frames/sec.

(3) Accessories

- a) 1,200' reel 2
- b) Connecting cord 1 set
- c) Lubricating oil 1 set
- d) Spare head
 - Recording head 1
 - Reproducing head 1
- e) Spare brake band 2

(31) Opaque Projector

(1) Requirements

- (a) Reflecting-projection type projector for use in combination with a vidicon camera during production of television programs.
- (b) Equipped with two or more opaque card insertion stages, each permitting fitting of such accessories as manual control card holder, light box, scroll.
- (c) More than five cards placed simultaneously in the manual control card holder, and still allowing the cards to be easily changed.
- (d) Two stages projected through a single projecting hole by means of a mirror system. The following accurate and simple operations are possible for switching between the stages:
 - * Momentary switching by means of pushbutton control for shutter performance.
 - * Resolution switching by means of fader.
 - * Switch control by turning on and off the light source.
 - * Switching of wipe in the vertical or slant directions or circumferentially, by means of the handle control.
- (e) Manual feeding of the card holder, with positive positioning determined by a click stop.
- (f) Two lamps used to illuminate each stage. A fan motor is used for cooling to prevent thermal damage to the card.
- (g) Optical axis parallel with the floor plane, and its height adjustable.

(2) Performances

(a) Ratings

- | | |
|---|--|
| (1) Size of picture | 75 x 100 mm |
| (2) Size of card | 100 x 125 mm |
| (3) Height of optical axis | 1,220 mm from the floor |
| (4) Adjustable range of optical axis height | More than ± 30 mm |
| (5) Lens | Focusing range 135 mm
Aperture ratio 3.5
Equipped with diaphragm |
| (6) Power supply | 100 V/200 V, 50 cps, less than 3 KVA |
| (7) Permissible ambient temperature | 0 to 45°C |
| (8) Operation | Continuous |

(b) Characteristics

- | | |
|--------------------------------------|--|
| (1) Resolution | More than 800 TV lines when projected to a size of 3/4" x 1/2" |
| (2) Uniformity of stage illumination | More than 70% |
| (3) Illumination of projected image | More than 1,000 lux |

(3) Accessories

- | | |
|---|----|
| (a) Vertical scroll (with automatic stop) | 1 |
| (b) Horizontal scroll (") | 1 |
| (c) Projection lamp | 10 |
| (d) Card holder for 5 cards | 10 |

(32) 35 mm Film Projector

(1) Requirements

- a) A projector which functions in combination with the vidicon camera to transmit standard 35 mm movies and also magnetic-recorded cinemascope movies to the television.
- b) Mechanisms of the automatic oiling type.
- c) Automatic change-over to the stand-by projection lamp whenever the main projection lamp fails.
- d) Still photos shown with this projector. To this end, the projector is capable of producing sufficient quantity of light without burning the film by using an infra-red reflector filter.
- e) Neutral density filter provided, thus permitting control of the quantity of light output.
- f) Time-meter provided for indication of elapsed operation time.
- g) Special light source filter lens for permitting the projector to be used for either black/white or color film.
- h) 24 VDC supply for relay power supply with the rectifier unit built-in the projector.
- i) Following operations remote controlled.
 - (1) Starting
 - (2) Stopping
 - (3) Still photo projection
 - (4) Control of quantity of light (ND filter)

(2) Performances

2.1 Ratings

- a) Film speed 25 frames/sec.
- b) Intermittent system Contant pitch

- c) Height of optical axis 1220 mm
- d) Adjustable range of above axis up to 12 mm up and down
- e) Projection lamp 1000 W (or 750W)
- f) Aperture Size 20.75 x 15.54 mm
- g) Shutter opening 165°
- h) Projection lens f = 180 mm
- i) Power input 50 c/s 230V 3 phase 600VA
50 c/s 100V Single phase 2500A

2.2 Characteristics

- a) Film capacity max 900m (30 mm operation)
- b) Build up time less than 3 sec.
- c) Automatic lamp change time less than 1 sec.
- d) Picture steadiness, percentage to picture width
 - Jump less than 0.15%
 - Weave less than 0.15%
- e) Transparency factor of N.D filter 100 - 1% continuously variable
- f) Resolution more than 500 TV lines
- g) Illumination of projected image more than 1000 lux
- h) Uniformity of illumination (shading) more than 80%
- i) Overall frequency response of sound reproduction system
 - Photo sound 100 - 7000 c/s within ±1.5 db
 - Magnetic sound 50 - 8000 c/s within ±1.5 db
- j) Signal to noise ratio more than 35 db
- k) Output impedance 600 ohms balanced
- l) Output level 10 dbm max
- m) Flutter and Wow less than 0.3%

(33) Optical Multiplexer

(1) Requirements

- a) Optical multiplexer which consists of two movable mirrors arranged perpendicular to each other and functions to switch and reflect the projected images from two film projectors and one slide projector, projecting them directly to one vidicon camera.
- b) Surface mirror used.
- c) Light path switched by magnet relay and signal transmitted for indication of the switching position.
- d) Switching of the light path by remote control.

(2) Performances

2.1 Ratings

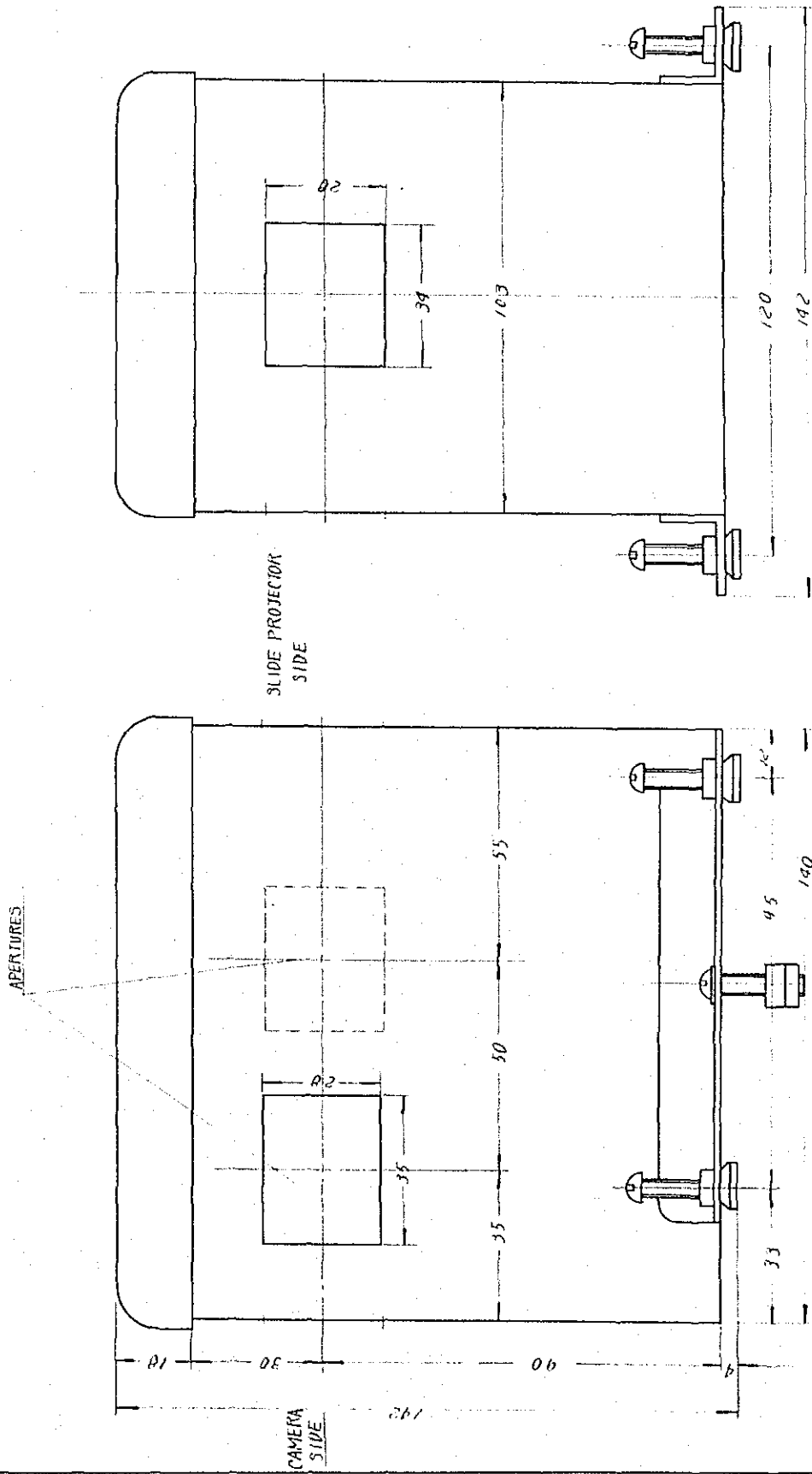
- (a) The sizes of the two mirrors and the outer case are similar to or as shown in Fig. 1.
- (b) Height of the optical axis 1,220 mm from the floor
- (c) Adjustable range of the optical axis height ± 10 mm
The above range is applicable when using the built-in pedestal or when the equipment is installed on the pedestal of the vidicon camera.
- (d) Power supply 24 VDC, 1 A

2.2 Characteristics

- a) The spectroscopic characteristic of the mirror is flat over wave-lengths of 3,000 to 7,500 Angstroms.
- b) The switching time of the mirror is less than 0.5 seconds.

(3) Constructions

- a) The mirror and the control are separate units.
- b) The mirror unit is installed as given in Section 2.1. The control circuit of the mirror driving magnet is accommodated in the control unit, that is at the suitable position of the pedestal of this equipment or the pedestal of the vidicon camera.



(FIG- 1)
 OUTSIDE VIEW OF MULTIPLEXER

(34) Slide Projector

(1) Requirements

- a) Projector capable of projecting 50 mm x 50 mm (2" x 2") slides to the vidicon camera.
- b) Slides placed in two disk type slide holders, and projected in sequence.
- c) Slide change and lamp operation by remote control.
- d) Prisms used as much as possible in the optical system. The quantity of light from slides of either side is equalized.

(2) Performances

a) Ratings

- | | |
|---|--|
| (1) Size of picture | 21 mm x 78 mm |
| (2) Size of slide | 50 mm x 50 mm |
| (3) Height of optical axis | 1,220 mm |
| (4) Adjustable range of optical axis height | More than ±30 mm |
| (5) Lens | Focusing range 135 mm
Aperture ratio 3.5,
equipped with Iris control |
| (6) Number of slides that can be accommodated at the time in disk type holder | 8 slides |
| (7) Power supply | AC 100 V, 50 cps, less than 3KVA |
| (8) Permissible ambient temperature | 0 to 45°C |
| (9) Operation | Continuous |

b) Characteristics

- | | |
|--|--|
| (1) Resolution | More than 800 TV lines when projected to a size of 3/4" x 1/2" |
| (2) Uniformity of illumination | More than 70% |
| (3) Illumination of projected image | More than 1,000 lux |
| (4) Minimum time interval for slide change | Less than 1 sec. |

(35) Film Sound Recorder

RCA TFR-1 Television Film Recorder

Television Film Recorder RCA Model TFR-1 type equipment.

(36) Automatic Film Developer

Eastman Viscomat Processor MODEL-30 type equivalent

Machine Speed : 36 ft-min for Positive, Sound Recording and TV

Recording films 18 ft/min for negative film

Film Magazine Capacity: 1,200 ft, 16 mm

Solution Capacity: 3,600 ft, of film per Cubitainer of
solution

Processing: Variable development time: $2\frac{1}{2}$ to
7 seconds at 36 ft/min

(37) 16 mm Film Printer

(1) Requirements

1. Positive printing of 16 mm negative film
2. Picture and sound printed
3. Film take-up by torque motor
4. Light adjustment preset by advanced detection
5. Easily transportable
6. Power supply (etc.) accomodated in main unit
7. Ratings as follows:

(2) Ratings

- | | |
|--------------------|-------------------------|
| 1. Film size | 16 mm |
| 2. Film capacity | Maximum 1,200 feet |
| 3. Printing speed | 60 - 90 feet/minute |
| 4. Printing method | Continuous adhesion |
| 5. Shutter | 22 exposure positions |
| 6. Aperture | Magnetic control system |
| 7. Power supply | 100 VAC 50 cps |
| 8. Operation | Continuous |

(38) 16 mm Film Editor

(1) Requirements

1. Film editing by viewing 16 mm film
2. Projection type picture
3. Optical and magnetic sound reproduction
4. 100 VAC projection lamp with light adjustor
5. Foot switch accessory for start/stop control
6. Amplifier and speaker constructed with main unit and assembled on roller table
7. Ratings as follows:

(2) Ratings

- | | |
|-------------------------------|------------------------------------|
| 1. Film | Standard 16 mm film |
| 2. Picture size | 80 x 60 mm |
| 3. Film feeding | Intermittent |
| 4. Film speed | 25 frames/second |
| 5. Film take-up system | Flow-into-basket type container |
| 6. Magnetic reproduction head | Movable (to film edges and center) |
| 7. Voice output | Maximum 3W |
| 8. Power supply | 100 VAC 50 cps |
| 9. Operation | Continuous |

(3) Accessories

- | | |
|----------------------------|-------|
| 1. Foot switch | 1 ea. |
| 2. Power cable (5m length) | 1 ea. |

(39) 35mm Film Editor

(1) Requirements

1. Film editing by viewing 35mm film
2. Direct view type picture
3. Optical and magnetic sound reproduction
4. 100 VAC projection lamp with light adjustor
5. Foot switch accessory for start/stop control
6. Amplifier and speaker constructed with main unit and assembled on roller table
7. Ratings as follows:

(2) Ratings

- | | |
|-------------------------------|---|
| 1. Film | Standard 35 mm film |
| 2. Film feeding | Crosscam system |
| 3. Film speed | 24 frames/second |
| 4. Film take-up system | Flow-into-basket type container |
| 5. Picture | Direct view type magnified
approximately 2 times |
| 6. Voice output | Maximum 3W |
| 7. Magnetic reproduction head | For 1 track use |
| 8. Power supply | 100 VAC 50 cps |
| 9. Operation | Continuous |

(3) Accessories

- | | |
|-----------------------------|-------|
| 1. Foot switch | 1 ea. |
| 2. Power cable (5 m length) | 1 ea. |

(40) Synchronizing Power Facility

(1) Requirements:

- (a) Converting a commercial power supply rated 100/200V, 45~55 cps, to a 50 cps power in perfect synchronise with the period of television vertical drive signal as recommended by the C.C.I.R.
- (b) Remote controlling switching "on" and "off" of the power supply.
- (c) Furnishing power to the synchronous motor incorporated in each of the film projector and the film recorder for synchronous operation of the motor.
- (d) Instantaneous starting without the necessity for a preheating time interval.
- (e) Restoring to normal output automatically upon recovery of load short-circuiting or overloads with the aid of a protective device.
- (f) Performing self-excited operation stably in a frequency range 47 - 49 cps in the absence of the vertical drive signals.

(2) Performances

Ratings

- 1) Input : AC 100/200V 45-55 c/s
- 2) Output : 50 c/s 100/200V
Output Capacity : 380 VA (Max.)
- 3) Regulation : full load - half load 15%
- 4) Synchronization : TV Vertical Drive Signal -4V P-P
- 5) Ambient Temperature : 0° - 50°C
- 6) Rating : Continuous

(41) Video Tape Recording Machine

(1) Requirements

- (a) It shall be a 4-head type television tape recorder designed for CCIR System TV broadcasting use.
- (b) It shall be complete asynchronous operation to power supplies.
- (c) It shall be provided interchangeability of video head assembly and video tape between same type video tape recorder.

(2) Performances

(a) Ratings

1) General

- (1) Tape width 50.8 mm
- (2) Tape transport speed 381 mm/sec.
- (3) Reel capacity 96 min., max.
- (4) Video track width Same as specified by SMPTE (U.S.A.) recommendation

(5) Ambient temperature and humidity:

Ambient temperature -10 to +45°C (It is desirable, however, to use the tape under an ambient temperature from +15 to +30°C because of the nature of tape.)

Humidity Less than 90%

- (6) Power source AC 100/234V, 50 c/s, singlephase;

2) Video channel

(1) Video input level

Composite video signal: 1.0 volts (p-p), positive

Impedance: 75 ohms, unbalanced

(2) Video output level:

Composite video signal
(vs) 1.0 volts (p-p)

Video signal (V) 0.7 volts (p-p)

Impedance 75 ohms, unbalanced

(3) Synchronizing signal
input level

Composite synchronizing
signal: 4 volts (p-p), negative

Impedance: High impedance (Bridge)

(4) Synchronizing signal
output level

Composite synchronizing
signal: 4 volts (p-p), negative

Impedance: 75 ohms, unbalanced

(5) FM carrier frequencies:

Monochrome
(monochrome deviation conform to SMPTE (U.S.A.) recommenda-
tion)

White level: 6.8 ± 0.05 Mc/s

Black level: 5.0 ± 0.05 Mc/s

Sync. level: 4.28 ± 0.05 Mc/s

3) Audio channel

- (1) Audio input level: +6 or -22 dBm;
600 ohms, balanced
- (2) Audio output level: +6 dBm; 600 ohms, balanced

4) Cue channel

- (1) Input level: +6 or -22 dBm; 600 ohms, balanced
- (2) Output level: +6 dBm; 600 ohms, balanced

(b) Characteristics

1) Video channel

- (1) Frequency response: +1.5 dB 20 cps to 4.1 Mc/s
- (2) Transient Response: Better than 10% with a 0.062 μ s
sine squared window signal.
maximum overshoot 12%
- (3) Linearity: Less than 5% (as measured
using stair step)
- (4) Signal-to-noise ratio:
Monochrome: More than 42 dB (p-o/r.m.s.)
- (5) Horizontal jitter:
Normal mode operation: Less than $\pm 1 \mu$ sec.
(except drift component below
1 c/s)
Sync.-lock operation: Less than $\pm 0.1 \mu$ sec.

2) Audio channel

- (1) Frequency response: ± 2 dB 50 to 10,000 c/s
- (2) Signal-to-noise ratio: More than 50 dB (r.m.s.)
at 1 Kc/s, 3% distortion level

(3) Distortion: Less than 1.5%, at 1 Kc/s,
measured at normal operating
level (normal operating level
is 6 db below 3% rms distortion
level)

(4) Wow and flutter: Less than 0.1% (weighted r.m.s.)

3) Cue audio channel

(1) Frequency response: ± 3 dB, 50 to 6,000 c/s

(Note: Response has 20 db
notch at 240 c/s)

(2) Signal-to-noise ratio: More than 45 dB (r.m.s.)

(3) Distortion: 5% (r.m.s.) at 1 Kc/s

(42) Outside Broadcasting Van

Requirements

- 1) Television Mobile Unit shall be for transporting apparatus, components and personnel necessary for television field pick-up.
- 2) It shall have a function of control room, and have three I.O. comera chains.
- 3) The roof shall be able to serve as a platform for a camera and SHF relay transmitter head with the parabolic reflector and antenna.
- 4) It shall be provided air conditioning equipment for comfortable temperature in the car.
- 5) An antenna pole for air monitor shall be provided.
- 6) All windows of the control room shall be screened by a curtain.
- 7) It shall be able to drag a trailer power unit.

(43) Television Trailer Power Unit

1) Requirements

- (a) It shall carry the electric generator and the power distribution board to supply electric power for the Television Mobile Units during operation.
- (b) The generator shall be driven by diesel engine. An automatic voltage regulator and frequency stabilizer shall be provided.

2) Performances

- (a) Operation : continuous (Fuel tank accommodate fuel needed 10 hours continuous operation)
- (b) Out put : AC 220 $\pm 10\%$ single phase 50 c/s 15 KVA
- (c) Voltage Regulation : less than 1%
- (d) Frequency Stability : less than 1%

(44) Portable Switcher

(1) General

A portable switcher designed for use with the image orthicon camera chain for field pickup use. Used in select a video signal from among several television cameras and for switching over a video signal from one camera in that from another in conjunction with the master monitor. Although designed for field pickup use primarily, but may be used in a studio in combination with the camera chain.

(2) Features

- 2.1 Incorporates gate circuits using diodes for switchover between video signals. All selective and switching operations for video signals may be performed on a remote-control basis as required.
- 2.2 By providing special effects such as, for example, "fade in", "fade out", or "overlap" freely for any two kinds of signals derived from each cameras, a single mixed signal can be taken from the switcher.
- 2.3 A video signal for which various kinds of effects have been provided or an "on-air" signal from the air monitor may be fed back in the camera head through the camera control. Therefore the cameraman can monitor a signal for which various effects have been provided or an "on-air" signal as required.
- 2.4 All operations for various effects and for signal switching can be performed in a remote-control basis, enabling the switcher to be operated from any desired location.
- 2.5 Incorporates a built-in rectifying power supply and hence, requires no extra power supply unit. The entire operation of this switcher is available from AC power mains, either, 80V-110V or 180V-210V.

2.6 Complete with an indicating voltmeter mounted on the front panel for checking the input and output power supply voltages for ease of maintenance and inspection

2.7 The video switching mechanism is devoid of any movable parts and hence, perfectly reliable against mechanical vibration. Furthermore the mechanism need not be designed to be dustproof.

(3) Performances

3.1 Camera inputs : Five inputs, each 1V (P-P), video signal.

Auxiliary inputs : Two inputs, each 1V (P-P), video signal
or 1.4V (P-P), composite signal.

Monitor input : 1.4V (P-P), composite signal.

Synchronising signal : 3.5V (P-P), negative polarity.

Horizontal drive signal : 3.5-5V (P-P), negative polarity.

3.2 Output signals

Video output : 1.4V (P-P), composite signal

Monitor output : 1.4V (P-P), composite signal

Master monitor output : 1.4V (P-P), composite signal

Send-back output : 1.4V (P-P), composite signal

3.3 Input impedances

Each camera input and each auxiliary

Input : 75 ohms

Monitor signal : High impedance

Synchronizing signal : High impedance

3.4 Frequency response

Gain deviation to be within 1 db in a frequency range 60 c/s - 8 Mc/s.

3.5 Noise

Hum S/N ratio to be in excess of 60 db with respect to composite signal output 1.4V (P-P)

3.6 Power supply and power consumption

AC power supply, 50 c/s, either 80-90-100-110V or 180-190-200-210V (due to reconnection of taps)

Power consumption : Approx. 100VA.

(45) Remote Amplifier

(1) Requirements

- (a) It shall be portable type, light weight, and enable mixing of 4 channels.
- (b) It shall be satisfied with the following ratings.
- (c) Power equipment consists of Rectifier and Battery to make a floating operation.

(2) Ratings

- (1) Input Impedance : 30, 150, 250 or 600 ohms
- (2) Output Impedance : 600 ohms
- (3) Gain : more than 90 db
- (4) Frequency Response : ± 1 db, 30 - 15,000 c/s (1000c/s as reference)
- (5) Distortion : Less than 1% (at the output 18 dbm)
- (6) Oscillator's Frequency and Distortion
 - Frequency : 1,000 \pm 50 c/s
 - Distortion : Less than 3% (at the output 4 dbm)
- (7) Noise : Below -120 dbm into converted input level
- (8) Cross Talk : Less than -60 db (between each of input circuits)
- (9) Microphone Input Level : +65 dbm
- (10) Rated Output Level : +5 dbm
- (11) Power Supply : DC 15 volts (dry cells or mercury dry cells) or AC 80 - 100V, 160 - 200V
- (12) Operation : 10 hours (dry cell) 100 hours (mercury dry cell) Continuous (AC)

