This defocusing which occurs in general when an electron beam is deflected, is dependent on the field distribution of the deflecting fields. One may consider the deflecting field as a flat one and if thereby that the errors are a minimum, it is impossible to eliminate them entirely. The magnitude of these errors is, however, also dependent on the construction of the electron beam in the deflecting fields. The narrowest the beam the smaller the error.

The result of the combination of the tube and the deflecting fields in the Philips projector is such that a rather uniform spot size is attained over the entire face of the tube making a dynamic focusing superfluous.

Another item worth mentioning is a small built-in monitoring tube, giving an as close as possible replica of what is shown on the projection tube. To this purpose the signal of the main picture is processed in a part of the video signal fed to the monitor screen. The purpose of the monitor is that most of the necessary adjustments can be made while the projection tube is kept off. Therefore, if the projected picture appears by removing the tube assembly and replacing it by a small, the well adjusted projection screen appears on the screen.

It has to be mentioned that precautions have been taken that no crosstalk occurs between the projection tube for the results of possible defects in the apparatus. In case of one of the deflecting coils of the face of the tube would be damaged rather instantaneously the defect has been added which biases the projection tube immediately beyond cut-off, if one of the adjustment currents would be failing.

All parts of the equipment have been assembled in one unit, the total weight being about 30 kg. In order to make it possible to remove the projector the two wheels can be attached. The projector the centre part of the apparatus being the main heavy part is mounted on a wheel and can therefore easily be removed.

The development of this projector took place in the Philips Research Laboratories. Engineering work has already been working there for over two years. This work was achieved by the collaboration of several workers in different fields. The final engineering of this Philips projector is now commercially available under the name "Philips" and it may be required, but there is not an adequate video bandwidth with the scan lines which the reproducers may be capable of reproducing, so that high signal-to-noise ratios are therefore not a problem. In view of these considerations, the Federal Communications Commission has scheduled hearings to determine the rights of the theaters interested in television spectrum space.

Regardless of the network method chosen the basic television standards should be the same. It therefore follows that the choice of interconnecting means and facilities will be independent of the final method of television picture presentation. STC-75 and STC-80C have been under development in the search for the best possible standards, and it is therefore necessary to arrive at a compromise being the direction to minimize line structure.

We believe that an 8 megacycle video channel, as proposed by the STC-75, is the minimum for acceptable noise figure. The value of 42 db for the electrical peak-to-peak signal-to-noise ratio has been suggested as being a representative value. The type of noise is also important; impulse type can be extremely troublesome, the impulse noise being the effect on the d.c. setting circuits. Single frequency noise can be noticeable, though low in level because it will beat with the scanning frequency to form interference patterns. Certain frequencies which are a multiple of horizontal scanning frequencies are to be avoided.

The fourth factor, total rendition, is also important and is dependent on the operating conditions of the camera in conjunction with the projector as a secondary effect. When the camera characteristics are well standardized, correction circuits can be introduced to enable the theater television projector to produce pictures comparable in quality to those produced by the standard home television system.

Transmission standards then must meet the following requirements: that an adequate video bandwidth be available in quality to those produced by the standard home television system. The present 4 1/4 megacycle standard is a compromise between the quality of line structure and the required information in the horizontal direction and the green bandwidth. Figure 1 illustrates the resolution which is possible for various choices of scanning lines and transmission bandwidths. For an example, with an 8 mc video band, we can determine the resolution of the system, but which scanning lines become the variable.

**TELEVISION RESOLUTION**

<table>
<thead>
<tr>
<th>Scanning Lines</th>
<th>525</th>
<th>625</th>
<th>735</th>
<th>819</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td>495</td>
<td>580</td>
<td>680</td>
<td>760</td>
</tr>
<tr>
<td>Horizontal</td>
<td>4,25 mc</td>
<td>340</td>
<td>283</td>
<td>240</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>680</td>
<td>620</td>
<td>565</td>
<td>527</td>
</tr>
</tbody>
</table>

It is to be noted that the present 4 1/4 mc broadcast standard permits a greater vertical resolution. The compromise being the direction to minimize line structure. If the bandwidth is increased, the number of scanning lines reduces the horizontal resolution. The data shown indicates that an 8 mc system will give a balanced resolution of 625 lines. The RCA PT-100 equipment has been designed
The projection kinescope is located and supported to permit the object which appears on its face plate to be seen on the screen by use of the combination of the mirror and lens. The blower shown keeps the face plate at a suitable operating temperature for efficient use of the phosphor.

The kinescope produced is similar in all respects to the RCA Victor Division at Lancaster, Pa., for its highlight output under conditions of operation. Figure 5 gives a cross-section view of the kinescope; the nominal size being 6 1/4 inches and shown at an eye level. The characteristic of the modulation, or video amplifier made it necessary to place this element adjacent to the kinescope. The projector was designed for remote operation, as shown in Figure 9, is hinged at a point which allows the projector face plate, and the necessary terminal boards to facilitate inter-connecting wiring.

The equipment is kept to a minimum with the required video amplifier, blower for cooling the kinescope face plate, and the only electronic element of the equipment now remaining in the projector established, it was decided that a very minimum of equipment should be located in the theater auditorium.

The block diagram, Figure 7, shows the location of the various parts of the system. There are the three divisions of the equipment with their respective locations; the projector located in the theater, the projection switchboard in the Projection Booth, and the High Voltage Supply in the Power or Generator Room.

Mechanical and Electrical Considerations:

With the limitation of the optics determined and the balance location of the projector established, it was decided that a very minimum of equipment should be located in the theater auditorium.

The block diagram, Figure 7, shows the location of the various parts of the system. There are the three divisions of the equipment with their respective locations; the projector located in the theater, the projection switchboard in the Projection Booth, and the High Voltage Supply in the Power or Generator Room.
are provided with remote indication on the control panel to show the proper functioning of the equipment. 

Loosening four nuts this panel may be removed from the chassis. The solid state voltage supply shows the unit with the very conservative design it is expected that the rectifier tubes will last from three to five years, in fact, the entire service. The location of the operating equipment prior to projection of the pictures is to be provided for the following contingencies:

1) Open or shorted deflecting yoke;  
2) Lack of drive due to tubes;  
3) Loss of supply voltages;  
4) Overdrive of kinescope (positive grid)

The most important consideration in the design of the protection system is the speed with which failure can be detected and corrective measures taken and in addition the circuits must be safe. The circuits operate in such a manner as to drive the kinescope to beam cutoff (and this must be accomplished in a matter of less than 50 microseconds) and then the relays operate to remove the high voltage power.

Equipment Operation: A signal selector panel was designed to facilitate the complete checking of the equipment prior to projection of the pictures to the screen. Experience gained had shown the value of a system of checks to be made by the operator prior to show time.

The switching system shown schematically in Figure 15 will take care of two incoming lines each of Video and Audio signals, and also monitor the projector video signal before the H. V. power is applied. The video and audio lines to the Projector and to the theater sound system respectively, as well as to an oscilloscope and a monitor, are provided for level setting and quality control. An off-the-air receiver is provided as a signal source during the initial period of use or as a source of test signal if the normal signal is to come via micro-waves or coaxial cable. The receiver is normally connected to Line 1 and an alternate signal is connected to Line 2. As auxiliaries to the signal selector a 7" picture monitor and a 3" oscilloscope are used to check the projector functions without projecting a picture on the screen.

The projector video amplifier has a cathode follower video return which supplies a signal, attenuated by a ratio of 10:1 from the kinescope drive. The return signal is marked, « projector », on the signal selector and the incoming signals marked, Line 1 and Line 2. The oscilloscope is a 3RP1 provided with a 60 cycle sine wave sweep, d.c. setting for the vertical deflection, and a calibration circuit. Marker lines, 1 volt peak-to-peak, are displayed when its switch is set on calibrate position. In operation Lines 1 and 2 are adjusted for level using the oscilloscope. When normal level is provided to the kinescope, by operation of the video attenuator the level for the projector can be set by adjustment of the return line from the projector.

The 7" monitor can likewise be switched to view the pictures on the incoming lines or from the Kinescope in the Projector, when on the projector a complete system operation check is obtained without requiring the picture on the theater screen. The monitor is provided with driving pulses from the Projector scanning circuits, then it shows the operation of the scanning lock-in as well as the picture quality, otherwise the monitor is synchronized from the incoming signal.

The Audio signal can be obtained from either Line 1, which is the off-the-air receiver, or Line 2 which may be a telephone line connection. Projector Audio would normally be connected to the theater motion picture sound system and is provided with an attenuator for level setting.

Figure 16 shows the Projection Booth equipment installed, consisting of the following auxiliaries: 

A signal source during the initial period of use or as a source of test signal if the normal signal is to come via micro-waves or coaxial cable. The receiver is normally connected to Line 1 and an alternate signal is connected to Line 2. As auxiliaries to the signal selector a 7" picture monitor and a 3" oscilloscope are used to check the projector functions without projecting a picture on the screen. The projector video amplifier has a cathode follower video return which supplies a signal, attenuated by a ratio of 10:1 from the kinescope drive. The return signal is marked, « projector », on the signal selector and the incoming signals marked, Line 1 and Line 2. The oscilloscope is a 3RP1 provided with a 60 cycle sine wave sweep, d.c. setting for the vertical deflection, and a calibration circuit. Marker lines, 1 volt peak-to-peak, are displayed when its switch is set on calibrate position. In operation Lines 1 and 2 are adjusted for level using the oscilloscope. When normal level is provided to the kinescope, by operation of the video attenuator the level for the projector can be set by adjustment of the return line from the projector.

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Processo reversibile per la registrazione e per la riproduzione elettronica dei film cinematografici

P. MANDEL

Prenendo lo spunto dalla necessità della trasmissione differenziata dei programmi di televisione l'autore esamina un processo reversibile suscettibile di registrazione per la riproduzione elettronica dei film cinematografici. Il procedimento prospetto utilizza un film di argento solvolato a velocità uniforme su quale l'immagine viene registrata mediante il sistema cassetta "fly-spot". Lo stesso apparato può venire utilizzato, dopo il trattamento di sviluppo del film, per la riproduzione elettronica del film cinematografico.

Parte della necessità dell'emissione differenziata dei programmi di televisione, lo rapporto esaminato un procedimento reversibile suscettibile di utilizzo per l'en- registrazione e per la riproduzione elettronica dei film cinematografici. Il procedimento prospetto utilizza un film di argento solvolato a velocità uniforme su quale l'immagine viene registrata mediante il sistema cassetta "fly-spot". Lo stesso apparato può venire utilizzato, dopo il trattamento di sviluppo del film, per la riproduzione elettronica del film cinematografico.

Parte del rapporto, la necessità dell'emissione differenziata dei programmi di televisione, lo rapporto esaminato un procedimento reversibile suscettibile di utilizzo per l'enregistrement et la reproduction électroniques des films cinématographiques. Le procédé proposé se sert d'un film sensible soumis à un traité de développement spécifique. L'image est enregistrée par l'utilisation du principe dite "fly spot". Le même appareillage peut être utilisé après développement du film pour sa reproduction électronique. Les avantages du procédé comme analy- seur sont les suivants:

- excellent rapport signal/sonde,
- absence totale de perturbations parasitaires
- possibilité d’obtenir une très haute définition,
- niveau noir fixe du signal d'analyse.

Les avantages du procédé pour l'entre-
registrement sont les suivants:

- absence de vibrations grâce au défi-
nement de l'appareil d'un grand format,
- absence de vibrations grâce au défi-
nement de l'appareil d'un grand format.

ANALYSER

Fonctionnement de principe.

Les films cinématographiques utilisent des éléments essentiels de l'analyseur (1). Le flux lumineux, issued du spot fluorescent P, est amplifié dans l'ensemble, lequel de l'appareil cinématographique, fournit une image de télévision ou, en vertu de la valeur de la tension du spot, le flux lumineux, atteint à l'analyseur. En vertu du ensemble, les chiffres offrent une solution de certains problèmes de résolution.

Nous avons choisi, entre les différen-
tes questions dont la discussion a été proposée au Congrès, l'examen d'un procédé qui pourrait ser-
vant une solution réussie de ces problèmes.

Le choix de l'appareil technique est basé, en partant des films cinématographiques, l'obtention de l'image télévision ou, en vertu de la valeur de la tension du spot, le flux lumineux, atteint à l'analyseur. En vertu du ensemble, les chiffres offrent une solution de certains problèmes de résolution.

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