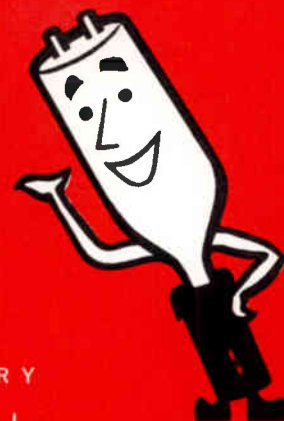




Tube Tips



A NEWSLETTER TO THE BROADCASTING INDUSTRY
RCA ELECTRON TUBE DIVISION, HARRISON, N. J.



RCA Announces New 1-Inch Vidicon With Higher Effective Sensitivity

A new 1-inch vidicon has recently been commercially announced as RCA-7038. The new cameras designed around this tube will be capable of much higher effective sensitivity. The 7038 has an optical-quality faceplate, utilizes an extremely uniform photolayer, and incorporates a 750-mesh screen. It has a resolution capability of 600 lines. All front-end parts are non-magnetic to facilitate registration in three-vidicon color TV cameras.

When used in new camera designs, the new tube is capable of producing pictures of broadcast quality with as little as one foot-candle of highlight illumination on its faceplate. This higher effective sensitivity can be realized in the 7038 because the uniformity of dark-current and sensitivity characteristics of this tube makes possible broadcast-quality operation at higher values of target voltage and dark current than are permissible with previous types of vidicons.

Spectral response of the 7038 covers the entire visible spectrum and thus enables the tube to translate color very accurately when operated in a color camera with appropriate color filters and optical arrangements.

The 7038 utilizes magnetic focusing and deflection. Its overall length is approximately 6¼ inches; its greatest diameter is about 1½ inches.

How to Avoid Target-Mesh Damage in Image Orthicons

Television broadcasters will be interested in these precautionary operating techniques which should be observed in using image orthicons to avoid damage to the target-mesh assembly.

The target-mesh assembly is the most delicate part of an image orthicon and consists of a thin glass disc

and a fine mesh screen placed in close proximity to one another. If the target glass and the mesh are allowed to come in contact due to faults in the operating technique, irreparable damage may result. Also, if either the glass or the mesh are excessively strained, they may not return to their normal positions.

The electrostatic attraction between the glass and the mesh, which is caused by a potential difference greater than 10 volts, is sufficient to cause the target glass and mesh either to be pulled together or to be excessively strained. If these internal components make contact with each other, small star-like spots may develop on the center area of the picture at the point where the glass has been contaminated by contact with the mesh. In the case of excessive strain, uneven landing may result from the variations in target glass to mesh spacing.

Aside from the application of improper voltages to the target, the wrong warm-up or standby procedure may result in a situation which will cause the target to charge to extremely high potentials. It is important to note that a positive charge may develop on the target glass whenever any voltages—positive with respect to the target—are applied to any tube elements in the absence of a beam from the thermionic cathode. This charge is the result of either or both photo and thermionic emission from the gun side of the target glass. If this condition continues for a prolonged period of time it can cause the target glass to approach the potential of near-by positive elements. This potential can easily increase to more than the 10-volt maximum limit.

This charging occurs most rapidly when either G2, G3, G4, and G5 or multiplier voltages are applied without a scanning beam and in the absence of G6 and photocathode voltages with light falling on the tube or even when the tube is in the dark. This charging, however, can also occur more slowly with the photocathode voltage applied and with light falling on the photocathode.

A reliable preventative measure is to use a small amount of beam current which will maintain the target at less than two volts potential. A flash of light on the photocathode during the initial set-up, with the photocathode voltage on, will neutralize any charge which may have built up on the target due to the absence of a beam during the first few minutes of operation. This light level should be approximately equivalent to that normally received from the highlights.

The following procedure is recommended to television broadcasters to insure that image orthicons are properly operated: (1) in warming up the tube, and each time the beam has been turned off, uncap the lens

momentarily and adjust the G1 voltage to give a small amount of beam current; (2) always leave beam current on during standbys.

Two methods are possible—with *normal beam current* on, all voltages normal: cap lens—with *normal beam current* on, set target voltage to cutoff and photocathode voltage to zero: lens open. (The advantage of the latter method is that operations can be remotely controlled from the video control room.)

New Price Schedule Announced

The RCA Electron Tube Division has prepared a new eight-page Distributor Resale Price Schedule (Form PLH-101B) which confirms additions, deletions, and changes to January 1, 1958. It contains complete up-to-date facts and figures on approximately 465 RCA industrial receiving, power, cathode-ray and phototube types, including their optional resale prices, capsule descriptions, approximate shipping weights, and adjustment codes.

A copy of the new schedule is enclosed with chief engineers' copies of this issue of TUBE TIPS. For additional copies of the Distributor Resale Price Schedule, see your RCA distributor or write to RCA Order Service, 34 Exchange Place, Jersey City 2, N. J.

Careful Operation Gives Image Orthicon At KFBB-TV a Long Life of 2605 Hours

Anthony J. Lopuch, chief engineer of KFBB and KFBB-TV, Great Falls, Mont., recently reported on the long life and excellent performance record of an RCA-5820 image orthicon.

In his letter he said, "We received this image orthicon on September 10, 1956, and installed it in our studio camera on October 18. This camera tube was used continuously for a total number of 2605 operational hours and was finally retired on September 23, 1957. The service record for this particular RCA-5820 is more than double the number of hours we have obtained from other (image orthicon) tubes we have used previously.

"The 'sticking' associated with image orthicons was no worse at 2500 hours than it was at the 500-hour time. The only adjustment that changed during the life of the tube was the amount of voltage which had to be applied to the target and this voltage had to be slightly increased as time went on."

At the end of his letter, Mr. Lopuch added, "Incidentally, this 5820 is still usable in a pinch or in an emergency!"

Such extraordinary long life reflects the quality of RCA image orthicons, but equally important is the intelligent, careful handling and operation of the camera tubes by the engineers using them. It is evident that Mr. Lopuch and his engineers know that even the finest of this delicate type of electron tube can be ruined early in life if it is not given the proper care and operational attention required.



How to Get More Hours from an RCA-5762 Power Triode

The life of an RCA-5762 power triode can be increased if these eight simple recommendations are followed:

- With forced-air cooling, keep blower in proper working order. Maximum temperature at the filament, plate and grid seals should not exceed 180° C.
- At full plate load, hold the filament voltage at 12.6 v. At reduced load, filament voltage can be reduced as much as 5% for longer life. In intermittent service where the standby periods are no longer than 15 minutes, reduce filament voltage to 80% of its normal value; for longer periods, the filament voltage should be turned off.
- Watch line voltage fluctuations; compensate for line voltage variations to avoid exceeding maximum ratings.
- Operate new tubes for 50-100 hours before storing. Operate spare tubes periodically.
- Allow filament to reach normal operating temperature before applying other voltages to the elements of the tube.
- Be sure that overload protection is working properly in the plate circuit to prevent overheating due to improper circuit adjustment, overloading, or loss of grid bias. Overheating may decrease filament emission; however, filament activity can sometimes be restored by operating the filament at rated voltage for 10 minutes or more with no voltage on the plate or grid. This process may be accelerated by raising the filament voltage to 15 volts (not higher) for a few minutes. Full air flow must be maintained during this reactivation process.
- Keep tube clean—remove dust or foreign material which may collect between the filament, plate, and grid seal terminals.
- Operate 5762 within RCA ratings as shown in the technical bulletin available on request from RCA Commercial Engineering, Harrison, N. J.

Test Equipment for Broadcasters

Three RCA test instruments of particular interest to television broadcasters are the WR-69A Television/FM Sweep Generator, WR-70A RF/IF/VF Marker Adder, and WR-99A Crystal-Calibrated Marker Generator.

The WR-69A is designed for sweep-frequency alignment of color and black-and-white TV receivers and monitors. When used in conjunction with an oscilloscope, the WR-69A Sweep Generator will provide a continuous trace display of the bandpass characteristics of the monitor under test.

The WR-69A provides rf, if, and video frequency output, permitting the alignment of picture- and sound-if amplifiers, video amplifiers, and chrominance circuitry in color-TV monitors and receivers. RF output is provided for each of the 12 VHF-TV channels. Individual channel output is selected by means of a switch. Output at the if and video frequencies is continuously tunable from 50 Kc to 50 Mc. Output voltage at minimum setting of the attenuator on all frequencies is at least 0.1 rms volt.

The swept output from the WR-69A is continuously adjustable up to at least 12 Mc on the TV-channel positions; maximum sweep width is adjustable up to at least 20 Mc on FM and if/video output. Maximum output amplitude variation is 0.1 db/Mc, thereby assuring an accurate picture of circuit bandpass characteristics. Frequency modulation of the rf signal is accomplished by a precision vibrating capacitor designed to withstand the rigors of continuous service. RF output is on fundamental frequencies only and is free from spurious responses and other frequency components which are characteristic of output from harmonic generators and beat-frequency oscillators.

A specially designed piston-type attenuator is used to couple the rf output to the rf-output cable. The piston provides smooth, undistorted attenuation over a range of 60 db, permitting accurate bandpass checks of high-gain circuits. A separate attenuator for the if/video output provides continuous adjustment over a 70-db range.

Alignment applications are greatly facilitated by the inclusion of two bias-voltage sources in the WR-69A. Negative voltages, continuously adjustable from 0 to -15 volts, are available at the front panel for use in biasing the tuner and if-amplifier agc buses in the equipment under test. Also provided is a front-panel rf-sample terminal which provides a fixed sample voltage from the rf-oscillator compartment. This feature permits use of the WR-69A with marker adder units, such as the RCA WR-70A RF/IF/VF Marker Adder, in alignment applications in which calibrated markers are added to the sweep curve after the sweep signal is taken out of the receiver or monitor under test.

A return-sweep blanking circuit is included in the WR-69A to provide a zero-reference line during alignment. Blanking is removed or applied by means of a front-panel switch. Other features of the WR-69A include thorough shielding and filtering to minimize radiation and leakage, and specially designed and terminated output cables for rf and if/video output.

The User price (optional) of the WR-69A is \$295.00.

The WR-70A RF/IF/VF Marker Adder is designed for use with conventional test equipment in the sweep-frequency alignment of rf, if, and video stages. The instrument produces narrow and distinct markers of



high amplitude on the response curve. Response-curve distortion is virtually eliminated, thereby simplifying trace-shape and frequency identification.

Four coaxial cables are supplied with the WR-70A for connection to a sweep generator, to a marker generator, to an oscilloscope, and to the equipment under test. The new unit has front-panel controls which provide an instant choice of one of four different marker shapes best suited to the response curve being observed. The WR-70A also eliminates distortion of marker or of the sweep curve by the marker due to clipping or overloading of the TV receiver circuits. The marker signal does not enter the rf, if, or vf channels of the receiver.

Other features of this new test instrument include elimination of marker "suckout" by the receiver circuit which enables simple and precise alignment of traps; provides very high-Q markers—high in amplitude, narrow in width; front-panel control of marker shape, amplitude, and polarity which simplifies black-and-white and color TV alignment procedure; and electron-tube regulator circuit for all B+ voltages which provides steady trace display on an oscilloscope.

User price (optional) of the WR-70A RF/IF/VF Marker Adder is \$97.50.

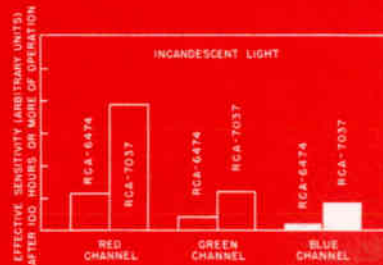
The new WR-99A Crystal-Calibrated Marker Generator is designed for use in the alignment and troubleshooting of black-and-white and color-TV receivers and monitors, FM receivers, and other equipment operating in the frequency range from 19 to 260 Mc. The WR-99A provides an rf output signal from 19 to 260 Mc in eight bands on fundamental frequencies. A wide choice of modulation facilities is provided, including 4.5 Mc which produces dual markers on a sweep-response curve to mark the picture-carrier and sound-carrier points on the curve.

The new instrument combines the functions of a marker generator, a horizontal bar pattern generator, and a heterodyne-frequency meter. The calibration of the instrument is straightforward—no charts are needed.

The tuning dial is specially marked with all VHF sound-carrier and picture-carrier frequencies as well as important intermediate frequencies in the 20-30 Mc and 40-50 Mc regions. Important color-TV frequencies are also marked on the dial scales.

A special socket located at the rear of the WR-99A permits the connection of an external crystal or L-C circuit into one of the internal calibration oscillators. When an external frequency-determining unit is used, it is possible to produce calibrating beats at intervals other than 1 or 10 Mc.

User price (optional) of the WR-99A Crystal-Calibrated Marker Generator is \$242.50.



RCA-7037—The New Standard in Color Camera Tubes. More than twice the average sensitivity of any previous color Image Orthicon—in each channel of color-camera systems.



new

IMAGE ORTHICON

for Color

You are looking at the new RCA-7037, an improved image orthicon that has much higher sensitivity—will outperform and outlast any other image orthicon—and retain high sensitivity throughout life.

Here are a few of the outstanding advantages of this new tube: (1) Higher effective sensitivity to red, green, and blue permits reduction in lighting level or lens aperture, (2) Increased ratio of blue to red sensitivity provides better balance of the effective sensitivity between color channels with incandescent lighting, (3) A new "stabilized" target greatly reduces any tendency toward an increase in picture "sticking" throughout the life span of the tube—and thus makes possible more hours of service and lowered camera operating cost, (4) Super-Dynode design insures freedom from dynode burn, (5) Micro-Mesh does away with defocusing to kill moiré and mesh pattern, and allows full aperture correction to improve picture-detail contrast.

RCA-7037 can be used in place of Type 6474 in all modern color-TV cameras—without changing color filters. RCA-7037's are available now—from your RCA Industrial Tube Distributor. For a technical bulletin, write RCA Commercial Engineering, Harrison, N. J.

How RCA-7037 can improve your Color Operations

- Reduces operating costs 3 ways—
—in lower studio lighting costs, both initially and throughout tube life
—in lower air-conditioning costs in station studios
—in lower camera-operating costs
- Gives you greater freedom in staging and lighting techniques
- Delivers longer tube life
- Provides "stabilized" target operation
- Extends tube pro-rata warranty from 350 to 500 hours
- Extends 100% tube warranty from 15 hours to 50 hours

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