

SYLVANIA NEWS

JANUARY 1952



C. J. Lufen, editor
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Vol. 19, No. 1

SYLVANIA WEEK IN OKLAHOMA

This is how the servicemen went through Sylvania's Shawnee plant

The last week in November was Sylvania week in Oklahoma. Designed to commemorate the Shawnee plant's first birthday, the week saw service meetings at Tulsa and Oklahoma City, a buffet luncheon followed by tours through Sylvania Radio Tube Plant at Shawnee for servicemen, and an anniversary cake cutting ceremony in which Sylvania President Don Mitchell participated.

The Tulsa Service meeting, which was sponsored by Ronnie Durham's Radio Inc., featured a lecture by Sylvania Field Engineer Allen White and a survey of Sylvania's 1951 advertising for service dealers by SYLVANIA NEWS Editor C. J. Luten. Arden Still, Sylvania's Southwestern Division Manager of Renewal Tube Sales, presided. Other Sylvania's in attendance were John Hauser, Assistant Sales Manager, Distributor Tubes; Bill Buschmann, Merchandising Manager; Bert Weidenhamer, Merchandising Coordinator; Hugh Luhr, Renewal Tube Salesman, Southwestern Division; and Bill Anderson, Sylvania Field Engineer.

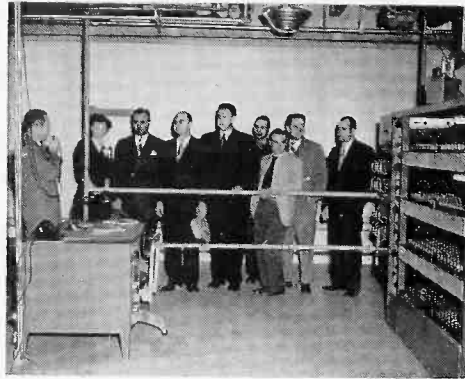
The Oklahoma City service meeting, sponsored by Joe E. Barnett's Radio Supply Inc., was similar in content to the Tulsa meeting. Unusually successful, the Oklahoma City meeting attracted the largest audience ever to see and hear this type of lecture-demonstration in Oklahoma.

Over 250 servicemen were guests of Radio Inc., Radio Supply Inc., and Sylvania for buffet luncheon and a tour through Sylvania's Shawnee plant. This tour graphically demonstrated to the servicemen how Sylvania produces tubes with quality built-in.

C. W. Hosterman, Shawnee plant manager, his engineering staff, and many attractive women employees who acted as receptionists were praised by all for their courteous and efficient job of conducting the tour.



1. Charles Hollingshead and A. J. Goodwin (standing) welcome a group of servicemen.



2. Hugh Hannifan (left) tells a group about Sylvania's quality control of finished tubes.



3. Plant tourtakers hear George Klotz talk about the stem department.



5. This group listens to Clois Green as he describes the delicate operations of the mounting department.



6. Leon Haddock gives the pitch on the filament spray room. (above).

7. Cathode tabbing machines and the filament department in general are the subjects of Peter Moller's lecture (below). Servicemen also saw and heard about the Shawnee plant's grid department.

8. Roy Clark (center) shows a portion of the material inspection department and describes its operation (photo at bottom right).



4. Boyd Plott (back to camera) describes the operation of a sealex machine.



Servicemen From Tulsa and Oklahoma City Areas Take Part in Shawnee Birthday Celebration



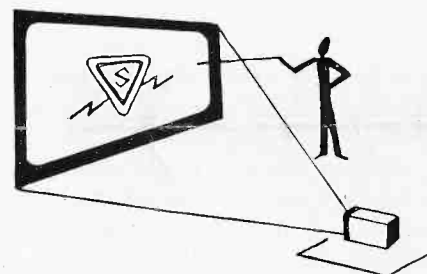
Ronnie Durham of Radio Inc., Tulsa (left) and Arden Still, Sylvania's South western Manager of Renewal Tube Sales, at the Tulsa Service Meeting (above).



In the photo above Bill Anderson, Sylvania Field Engineer, is telling Oklahoma City servicemen about a part of a television circuit.



At right Allen White, Sylvania Field Engineer, is shown making an important point during his portion of the lecture-demonstration at the Oklahoma City Service Meeting.



Sylvanians in attendance (left to right): C. J. Luten, Hugh Luhr, Allen White, John Hauser, Bert Weidenhamer, Bill Anderson, Arden Still, Bill Buschmann (photo at left).

Sylvania President Don Mitchell (center left), C. W. Hosterman, Shawnee Plant Manager, and some of the plant employees who acted as receptionists are ready to greet their many guests. (photo below).



Don Mitchell made a special trip from New York City to light the candle on the Shawnee plant's first birthday cake. (below).



SYLVANIA UPHOLDS DEALERS, PROVES 87.5% OF PUBLIC SATISFIED WITH SERVICING

In the September issue of SYLVANIA NEWS, it was announced that Sylvania had cancelled all *Look Magazine* advertising in protest of Philip Wylie's article which hurt the reputation of radio and television service dealers everywhere.

Shortly thereafter Sylvania hired a qualified research agency to interview 800 television set owners so that it could present an authoritative reply to Wylie's article based on fact. *Look Magazine*, in an effort to present both sides of the controversy, gave Sylvania space in its *Letters and Pictures Column* (January 1st issue). Here Sylvania has presented facts which indicate the public's belief in the integrity of America's service dealers.

For those readers who missed reading Terry P. Cunningham's letter, here is a facsimile of *Look's Letters and Pictures Column* which contained it.

The tremendous support that America's service dealers have given Sylvania during this controversy doubtless accounts for the belated reply from the RCA Service Company also shown. It is also noteworthy that RCA at no time carried service dealer advertising in *Look* which it could cancel in defiance of Wylie's article and that it regrettably has not supported its worthy sentiments with an appropriate body of facts.

LETTERS and PICTURES

continued

TV Repairmen

Recent magazine articles have condemned the radio and television repairman as unscrupulous both in the quality of work he does and the price he charges. We're like the old neighbor that lives next door. We were born and raised with these radio servicemen. We sold radio tubes to them 25 years ago and have done so in increasing numbers since. We think your readers are entitled to know honestly what the next-door neighbor knows about these fellows. for we are frankly concerned at the statements we read about them.

First, these radio and television repairmen are not rich. If, as claimed, they are cheating the public, they are doing so unsuccessfully. They have remained in the servicing business for two principal reasons:

1. They can be independent.
2. They like to make electronic things work.

To check our own opinion, we were prompted after a recent *LOOK* article (*Pop Is a Moral Slacker*, by Philip Wylie, *LOOK*, July 3, 1951) to conduct an impartial survey to find out what the average set owner thought of his serviceman.

We hired a qualified research agency to interview 800 television set owners in the New York television area (New Jersey, Long Island, Westchester County and New York City) because this area had been often named as representative of the worst in television and radio servicing conditions. The owners interviewed represented every income bracket, owned many different kinds of sets, were new and "old-time" set owners and used a wide variety of service organizations.

Set owners were asked among other things: 1) On how many occasions had they called a repairman? 2) When was the set last repaired? 3) What was wrong; how long did it take to fix it; was the set removed to a repair shop; what new parts were installed? 4) What was the amount of the repair bill? 5) Was the repair job satisfactory or unsatisfactory as to quality? 6) Was the price charged for the repair job satisfactory or unsatisfactory? 7) At any time had they thought repair work unsatisfactory? 8) Had they ever changed repairmen?

When instances of dissatisfaction were encountered, the agency instructed the interviewers to obtain a complete report whether incompetence, dishonesty or other questionable practices are encountered.

We are happy to make available to *LOOK* the results of this survey: 87.5% of radio and television owners are fully satisfied with the quality of repair work performed on their sets.

92% of set owners are satisfied that the charges for repair work were fair.

Only 8% criticized the work on the basis of excessive cost.

In respect to this 8%, which were investigated exhaustively, the investigating agency had this to say:

"An analysis of the small sample of 8% indicates very strongly that at least one third were not fully justified in their accusation. Much of the source of misunderstanding seems to lie in the fact that the set owner little appreciates the com-

plexity of a radio or television set and the considerable amount of technical or practical knowledge required to accomplish repairs effectively and efficiently. Furthermore, the public does not fully appreciate the level of labor costs nor can they comprehend the substantial charges for overhead that a repairman must make if he is to maintain a profitable business. Few people realize the substantial investment required for the average repair facility."

To make sure we had the complete story, we then sent the research agency into typical repair shops. "Find out," we said, "what are the actual pricing and repair policies of these servicemen."

Again we discovered that servicemen are generally honest. They charged from \$3.00 for a house call and \$7.50 per hour for bench work to \$6.00 per house call and \$2.00 per hour for bench work after an estimate was approved by the customer. Despite charges of \$2.00 to \$5.00 for an estimate, they frequently lost money on it due to the fact that time required for diagnosis of the actual trouble represented much of the time required for the service job. They, of course, charged for parts, with normal markups of 40-50%.

This survey indicates to us that the public in general does not share the suspicion and distrust with which the radio and television serviceman has been regarded in many current magazine articles. What suspicion does exist might be dispelled by consideration of these facts:

1. More than 1000 different television-set models are in use today. A qualified serviceman must maintain a technical reference library—at considerable cost—that will provide him necessary circuit information on all of these models.

2. Despite its moderate initial cost (\$200-\$300), a television set is a complex and complicated combination of some six different types of electronic circuits. Finding the trouble takes skill, time, tools. . . .

3. An average of five years' training and experience is required to produce qualified television repairmen. To get such skill, repair organizations must pay \$75 a week.

4. Add to this an investment of \$1500 in necessary electronic testing instruments and tools, \$4000 in inventory of 600 different types of tubes and parts, and store and truck maintenance. . . .

TERRY P. CUNNINGHAM
Director of Advertising
Sylvania Electric Products Inc.
New York, N. Y.

After reading Philip Wylie's article, have concluded there is misunderstanding of job done by radio and television servicemen. To us it is minor miracle that radio and television servicemen could continue to service 90 million radio sets while installing, servicing and adjusting nearly 15 million television sets since 1947. Frankly, we tip our hats to the radio-television-service industry. We genuinely marvel at great task performed with such high degree of integrity and skill.

E. C. CAHILL, President
RCA Service Company
Camden, N. J.

END

TV SET SERVICING WITH AN OSCILLOSCOPE

By J. S. ALLEN,* Advanced Application Engineer

Many techniques have been developed for successful radio servicing. These include voltage, continuity, and resistance checks of various parts of the circuit, and signal tracing beginning with audio sections and working through the i f amplifier to the converter and, in some cases, r f stage. Conveniently, performance may be evaluated for the most part by listening to the result in the loud-speaker as the audio oscillator or a m signal generator is moved from stage to stage.

Similar techniques may be applied in television servicing, insofar as the sound and picture sections are concerned. The use of an a m signal generator will allow visual observation of a bar pattern on the picture tube and video performance may be checked from the video amplifier back through the tuner to the antenna terminals. A check of the sound section may be made with an f m signal generator in the same way.

Beyond this, however, the similarity ends and other means must be employed to find trouble. It is here that the oscilloscope is an extremely valuable instrument. Either the Sylvania Type 132Z or Type 400 oscilloscope is a satisfactory unit. More accurate waveshapes are obtained with the Type 400 oscilloscope under the same conditions because of its extended bandwidth. This difference is particularly apparent when observing the composite video signal following the video detector. With the Type 400 'scope, sync pulses are rectangular, while with the Type 132Z 'scope the sync pulses are rounded because this unit does not have sufficient bandwidth to reproduce steep fronted pulses. This difference in reproducing ability is not of too great importance in service

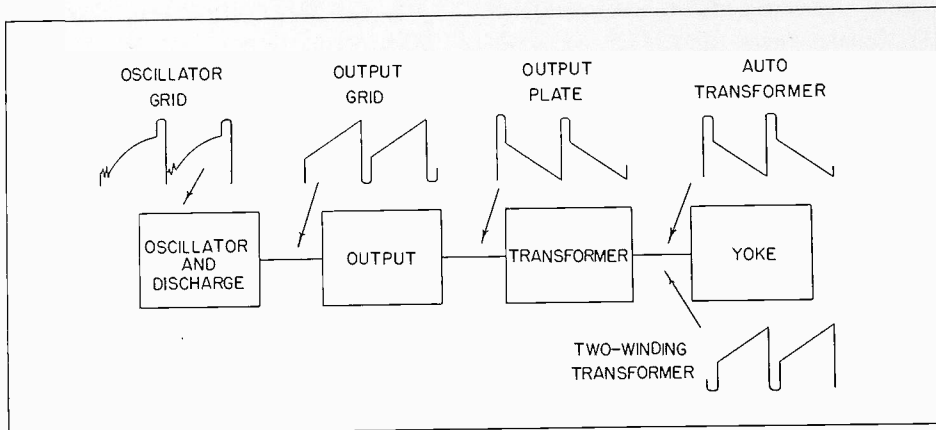


Figure 1. Block diagram and typical waveshapes obtained in vertical deflection system, with 'scope sweep set at 30 c p s.

work; however, the difference is noted here so that the serviceman will not be distressed if the waveshapes he observes are not precisely as shown in service bulletins or in this article.

It will be found in any television receiver, regardless of make or model, that certain voltages appear at certain points and that these voltages have characteristic waveshapes. Their magnitudes may be determined by various instruments, such as peak reading voltmeters. However, such measurements reveal little or nothing

about the shape which is of equal or greater importance in many cases.

Let us first look at the deflection sections of the receiver. The vertical deflection system usually consists of a blocking oscillator (with or without a separate discharge tube), a vertical output tube (usually a triode connected pentode or one of the specially designed vertical output triodes), the output transformer (either auto or two winding type) and the vertical deflection coils of the yoke. A block diagram, Figure 1, shows typical

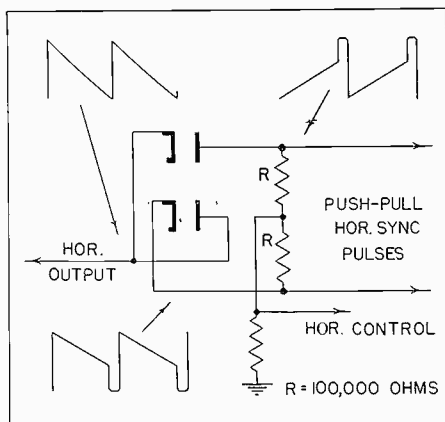


Figure 2. Typical waveshapes obtained in one type horizontal control, with 'scope sweep at 7875 c p s.

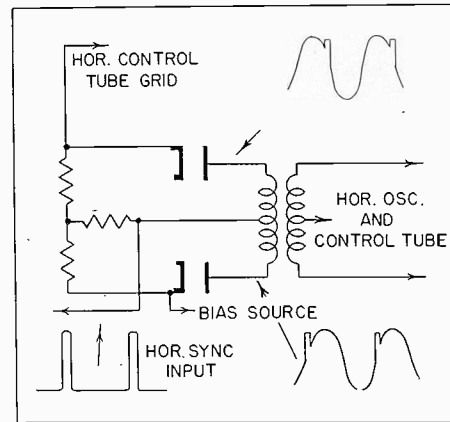


Figure 3. Typical waveshapes obtained in another type horizontal control, with 'scope sweep at 7875 c p s.

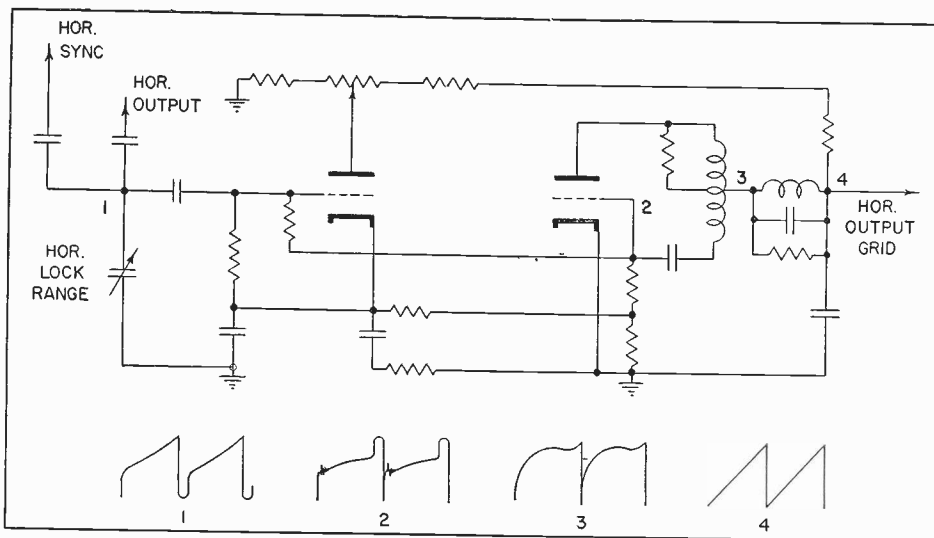


Figure 4. Typical waveshapes obtained in a third type horizontal control, with scope sweep at 7875 c p s.

voltage waveshapes at various points. Care should be taken when attempting to observe the output tube plate voltage, since, in late model receivers with wide angle picture tubes and high second anode voltages, this pulse may approach a 2000 volt peak. Unless some means is employed to reduce the magnitude applied to the oscilloscope there is danger of damaging the input coupling capacitor. A simple resistance voltage divider of, say, one megohm total resistance should be satisfactory for this purpose.

In some of the leading tv models, a multivibrator vertical deflection system is used, in which the output tube is one leg of the multivibrator and the usual oscillator the other leg. In such receivers, the oscillator grid voltage will not be as shown although the others will be unchanged.

Horizontal deflection systems are somewhat more difficult, due to their greater variety and increased complexity. There are three circuit

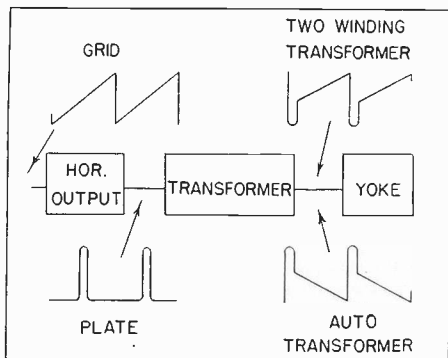


Figure 5. Block diagram of remainder of scanning and high voltage section, and waveforms obtained (which are similar regardless of type horizontal oscillator and control employed).

arrangements generally used to maintain synchronism of the horizontal deflection system with the transmitted sync pulses, all designed to reduce the susceptibility of the horizontal deflection to noise. This condition is obtained by making the horizontal deflection system sensitive only to the phase of the sync pulses with respect to generated sweep voltage rather than sensitive to sync pulse amplitude. In this way, noise immunity is obtained.

Depending on which system of horizontal control is used, different waveforms will be obtained, except for those from the output tube grid on through to the deflection yoke.

Two of the control systems employ duo-diode discriminators. In one of these, Figure 2, push-pull sync pulses are applied to plate and cathode of opposite diodes. The remaining plate and cathode are tied together, and applied to these is a sawtooth signal derived from the horizontal output tube. If the sync pulses and sawtooth signals are of the proper phase relationship, the voltage at the junction of the 100K resistors will be zero and no correction voltage will be applied to the oscillator. Under these conditions the waveforms will be as shown. If the receiver goes out of sync, the sync pulses will be observed to slide down the sawtooth portion.

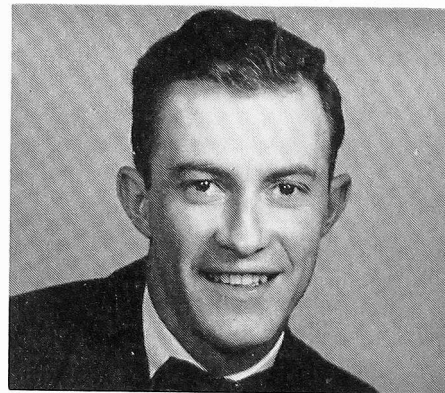
The second type employs a circuit similar to that shown in Figure 3. Waveforms obtained with proper operation are as shown.

The third type uses a triode section as the horizontal control tube. In circuits of this variety, appropriate waveforms will be those shown in Figure 4. Figure 5 is a block diagram of the remainder of the horizontal scanning and high voltage section. Waveforms here are similar, regardless of the type horizontal oscillator and control employed. Do not attempt to observe the voltage at the horizontal output plate without the use of a capacity voltage divider.* The pulse voltage may rise to 5500 volts which may do considerable damage if applied directly to an oscilloscope.

(EDITOR'S NOTE:—Next month's Technical Section will carry a continuation of Mr. Allen's study of oscilloscope waveform analysis. He will include notes on and waveforms in the sync circuits and the video amplifier. An analysis of the composite video waveform, and how it may be observed and studied, will be included.)

*James S. Allen is a member of the Advanced Applications Section of Sylvania's Commercial Engineering Department at Emporium, Pa. He joined Sylvania in 1948, after receiving his B. S. in mechanical engineering from California Institute of Technology. At present, he is involved chiefly with work on television, scanning problems and special projects. Allen holds an amateur radio operator's license, with the call letters W7PFX/3.

NEW SALES SERVICE ENGINEER



W. J. Anderson, formerly of Sylvania's Commercial Engineering Department at Emporium, has been appointed Sales Service Engineer and will conduct a new series of Sylvania Service Meetings in 1952. Holder of a BS in Electrical Engineering, Anderson was previously employed by Goodyear Aircraft Corp. where he worked on radar, special equipment, and electrical systems. He is an associate member of I.R.E. and a member of the National Association of Foremen.

OSCILLOSCOPE MODIFICATION FOR 120 CYCLE SYNCHRONIZATION

By The Engineering Staff of Howard W. Sams PHOTOFACT INDEX

While performing a visual alignment on a m or f m receivers, or the sound i f in tv receivers, it is often desirable to use a 120-cycle horizontal sweep in the scope. This makes it possible to obtain a "mirrored" image which aids in obtaining a symmetrical pattern. This is especially true in the case of discriminator or ratio detector alignment where an "X" pattern can be used instead of an "S" pattern. In order to synchronize the sweep, however, a 120-cycle signal is required. Many of the later model scopes provide this signal which can be obtained by setting the Sync Selector switch to the 120-cycle position and adjusting the sync amplitude control to the correct level. On earlier model scopes which were not designed to provide the 120-cycle signal, a simple modification can be made to provide this feature.

Any scope employing a full wave rectifier to supply the B+ voltage (not the high voltage for the cathode ray tube) can be modified. Across the input filter capacitor is a 120-cycle signal having a sawtooth waveform

with a rather sharp rise on the leading edge. This is due to the peak current through the rectifier. By using a coupling capacitor to block the d c, this sawtooth signal may be coupled to the sync circuit to obtain synchronization at 120 cycles. Since this sync signal is not wanted at all times, provision for switching the signal should be made. On the earlier model scopes having a Sync Selector switch, three positions are usually employed. These provide "Internal," "60 cycle" and "External" sync. If such is the case, it is recommended that the "60-cycle" position be used for the 120-cycle signal.

To make the modification, remove the lead that provides the 60-cycle signal to the switch. This signal is usually obtained from a filament line or from the high voltage of the power transformer through a suitable dropping network. In case of the latter, it is suggested that the components be left in the unit so that it could be more easily restored to its original wiring if desired. Connect a .1 mfd. or .25 mfd., 600v, capacitor from the

positive terminal of the input filter capacitor to the terminal on the Sync Selector switch from which the lead mentioned above was removed. Thus when a 120-cycle sync signal is required, turn Sync Selector to the 60-cycle position and adjust the Sync Amplitude to synchronize the signal. If desired, the label on the front panel can be changed to read 120 cycles.

The 60-cycle sync signal which has been removed is required only occasionally. It can still be obtained by turning the Sync Selector to "Ext." and connecting a lead from the "Ext. Sync Jack" to a 6.3v a c filament line in the equipment under test.

A little practice in using 120-cycle horizontal sweep should result in faster and more accurate alignment jobs. Remember, however, that this method can be used only when a symmetrical pattern is desired. When aligning for unsymmetrical response curves, such as in video i f amplifier, the synchronized sweep voltage from the signal generator must be used.

NOTES ON TUBE TESTER SHORT CHECKS

By J. H. CANNING, Engineer in Charge, Williamsport Plant

Although it is the purpose of any tube tester design to simplify operation as much as possible, it is felt that the requirements as to leakage in various types of tubes for various applications are so different that it is difficult to obtain maximum value from a test using a neon bulb, which simply measures the leakage of the tube with respect to one predetermined point. For example, the commonly encountered neon bulb leakage tester indicates a short when the leakage resistance of the tube is approximately 100,000 ohms. This

indication is satisfactory for applications when the maximum tolerable leakage resistance is of the order of 100,000 ohms. High impedance r f circuits require tubes having extremely high leakage resistance between elements for satisfactory operation. Power type tubes, on the other hand, where impedance in the grid circuit is comparatively low, may permit operation with resistances as low as 10,000 ohms. Therefore, a result of the use of a neon leakage tester might be to discard away tubes which would be good in low impedance circuits or

to accept tubes which actually have too much leakage for very high impedance circuits.

The leakage test used in the Sylvania Tube Tester Type 219-220 overcomes this situation by utilizing a continuously reading ohmmeter circuit which is adjusted so that the center scale reading is 10,000 ohms. Therefore, any tube which has leakage less than 10,000 ohms between elements under test will fall into the red portion of the scale. Above the center, the actual values of resistance

(Continued on page 8)

TECHNICAL SECTION INDEX

JANUARY 1950 TO DECEMBER 1951

This annual index is prepared for the use of those servicemen who keep their copies for reference.

Bound volumes of all previous issues are available for \$1.00 each as follows:

- Vol. 1 Technical Sections
1935 to 1940 inclusive
- Vol. 2 Technical Sections
1941 to 1945 inclusive
- Vol. 3 Technical Sections
1946 to date (loose-leaf)

(Continued from page 7)

increase exponentially, so that 4 or 5 megohms is indicated before the meter reaches the full scale deflection point.

The sensitivity of this test is indicated by the fact that when it is applied between cathode and any other element in such an order that the current tends to flow in the same direction as the tube emits, a very low reading will be obtained. This phenomenon is the basis for a special test incorporated in the Sylvania Type 219-220 testers, which consists of removing all the elements from the circuit except the cathode and the heater and applying the test in such polarity that any leakage between these two elements will be indicated. The same considerations as to critical limit of leakage apply here as between other elements.

The actual circuit is again the determining factor with respect to the amount of tolerable heater cathode leakage. Tubes which are normally operated either cathode at ground potential, or well bypassed to ground, are not nearly so critical as circuits where the cathodes of the tubes are considerably above ground and move about with varying potentials which leak over from the a c operated filaments.

The leakage test contained in the Sylvania Type 219-220 tube testers enables the serviceman to evaluate tubes accurately and to select tubes, where necessary, for special applications. The result is improved set performance and increased customer satisfaction.

| | | | |
|---|--------|---|--------|
| Airline 84-HA-3002B and Hallcrafters T 54-505—Distortion . . . | 18 - 8 | RCA 8BX5 (A C - D C) Microphonic Tubes | 17 - 5 |
| Alignment Procedure for Receivers Without L.F. Padder | 18 - 3 | Removing Studs from Plastic Cabinets | 18 - 9 |
| Car Antennas | 17 - 4 | Replacing Resistors and Capacitors | 18 - 6 |
| Colonial—Mopar 602 | 18 - 3 | Squeaks and Howls in A C-D C Radios | 17 - 4 |
| Dark Vertical Lines | 18 - 8 | Static in Car Radios | 18 - 3 |
| Delco R-1409 (Burning Out 3Q5GT) | 17 - 2 | Stringing Dial Cable | 18 - 6 |
| Firestone, Model 4-A-68 | 17 - 4 | Substituting PM Speaker for Electro-dynamic | 17 - 2 |
| Freed-Eiseman, Model 46 (FM) | 17 - 4 | Tube Replacement in English Sets | 17 - 5 |
| Garod TV Receiver | 18 - 3 | TV Antenna Installation | 18 - 9 |
| GE-F 63 (Howl After Replacing Output Transformer) | 17 - 5 | Use for Hypodermic Needle in Shop | 17 - 4 |
| GE TV, Models 817 and 821 | 18 - 3 | Watering Batteries in Portables | 18 - 3 |
| Hallcrafters 760 (No Hold on Horizontal Control) | 18 - 8 | Weak Converter Oscillation in 3-Way Portables | 18 - 3 |
| Keeping Your Resistor Stock | 17 - 4 | Zenith 4G800—Distortion | 17 - 5 |
| Philco 35-1285 Record Changer | 17 - 2 | | |
| Philco-Dodge C 4608 (Vibrator Trouble) | 17 - 5 | | |

Service Hints

CAPEHART CX33 SERIES—Unstable sync and no control of the AGC takes place when .01 μ f condenser across volume control from pin 3-12AU7 AGC detector opens. This is a common trouble on Capehart CX33 series. C232 on the diagram.

ANOTHER HINT ON THE SAME SERIES SETS—A washed out picture takes place with a breakdown (series resistor in brightness control). This 27K resistor is one half of shading pot and effectively maintains the bias levels for the entire set. Replace with equivalent value and a higher wattage resistor. R236 on the diagram.—Harry Ringel, New York City.

In all sets feeding back a portion of the vertical retrace, check for an open coupling condenser from vertical output section to brightness control. Complaint for this is white retrace lines in pix when brightness is brought up to viewable level. (On Emerson 124B series, Emerson 669B and 675B.)—Harry Ringel, New York City.

ZENITH MODEL 28-T9—and other sets which have a so-called blow-up or close-up system, I found no evidence of cathode voltage at the vertical output amplifier tube, which in this case was a 6V6, as this takes the form of a plug in adapter arrangement with the 6V6 plugged in on top. I removed the tube from the adapter and plugged it in to its socket on the chassis. This trouble previously gave no picture except for a single $\frac{1}{2}$ inch horizontal sweep which was restored. The blow-up adapter unit can be repaired or replaced if wanted. Trouble was a broken lead in the adapter tube base.—Damon P. Francis, New Haven, Conn.

MOST TV SETS have a two-prong a c connection on chassis and a plug on the back of the set's back cover permanently fastened. An excellent substitute while repairing the set can be had by using an ordinary electric iron cord as a plug-in a c

cord. This makes it possible to repair set without removing a c plug and cord from rear cover of the cabinet.—Damon P. Francis, New Haven, Conn.

PHILCO, MODEL 40-150—The two local stations were coming in strongly at several points on the dial at frequencies lower than those of the stations which are 1150 kc and 1230 kc. A new antenna loading transformer ended this condition completely. With it the two local stations came in only on their assigned frequencies. Signals from the other stations were louder and clearer as well. (A new antenna transformer remedied this same condition in a four tube superhet.) — Jerome Fowler, Tuscaloosa, Ala.

TUBE VISE—A small jar may be used to hold a tube while soldering pins, or making tests with an ohmmeter, etc. I have also found fingernail polish remover to be a good cleaner for joints to be soldered.—Edgar Grafton, Jr., Chattanooga, Tenn.

PHILCO TV 1700-1800 SERIES—Consistent blowing of "B" supply fuse with no apparent cause for trouble may be remedied by replacing damper tube 6BY5. Proper fuse should be 0.6 amp delayed action fuse.—D. E. Colvin, Churchville, New York. (EDITOR'S NOTE: Old tubes of this type may test "OK" on the tube tester, but still break down on the high peak voltages found in some television sets.)

IMPORTANCE OF CAPACITORS—In servicing both TV and radio receivers, I don't think enough importance is given to proper capacitor checking. So many tv and radio troubles can be found to be capacitor troubles. (By capacitor checking, I mean checking capacity, power factor, working voltage, etc.). I consider my capacitor checker my greatest advantage and do not know how I could get along without it.—D. E. Colvin, Churchville, New York.



MERCHANDISING SECTION

JANUARY 1952 Vol. 19, No. 1

SYLVANIA LAUNCHES THE MOST EXPENSIVE CAMPAIGN IN RADIO PARTS INDUSTRY HISTORY TO ADVERTISE YOUR RADIO-TV SERVICE

There has never before been an advertising campaign for radio-TV service dealers to match the one Sylvania has planned for 1952. Every prospect in your trading area will think of you when he needs radio or television repairs, if you display the Sylvania Radio-Television Service Emblem.

The Sylvania emblem will identify your service to your old and potential customers throughout the year when they read about you in Sylvania's eye-popping national magazine ads. Five famous movie, sports, TV and stage stars will endorse your service. When you display the Sylvania emblem, you will have alluring Jane Russell, baseball's "manager of the year" Leo Durocher and his fascinating actress-wife Laraine Day, bewitching Ann Blyth, and the charming Broadway actress June Havoc—all of them—working for you. In *Life*, *Collier's*, *Saturday Evening Post*, and *Better Homes & Gardens*, these five celebrities will be putting in a plug for your service from March through December.

If all of your customers and prospects read just one of these famous magazines (and most of them probably read more than one), they will have four chances to stop and admire the beautiful new photographs of the stars in these ads. Four chances, too, to read that these stars recommend your service.

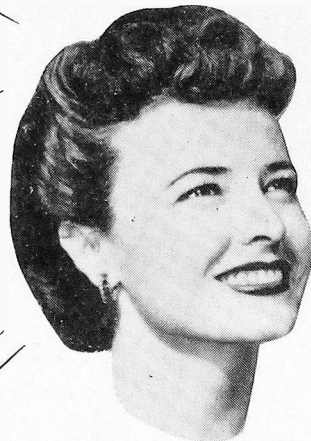
Here is Sylvania's national magazine schedule. You will find the Jane Russell ad in *Life* on March 10, *Collier's* March 29, *Post* April 12, and in the April *Better Homes & Gardens*. Leo Durocher and Laraine Day will appear in *Life* on May 5, *Collier's*



Jane Russell



June Havoc



Leo Durocher



May 24, *Post* June 7, and in the June *Better Homes & Gardens* . . . those dates are around the beginning of the 1952 baseball season. The Ann Blyth ad will be seen by your customers in *Life*, *Collier's*, *Post* and *Better Homes & Gardens* during September and October. June Havoc ads will appear about the beginning of the fall theater season in *Life*, *Collier's* and *Better Homes & Gardens*.



Ann Blyth

A HEADACHE REMEDY FOR '53; USE SYLVANIA'S BUSINESS RECORD BOOK IN '52



The Collector of Internal Revenue has got his hand out and he's looking for you. It's income tax time again.

He wants to know how much money you made in 1951, your deductions for legitimate business expense, and your total profit. And you have got to know.

If you have used the Sylvania Business Record Book during the past year, you don't have to worry. You know all the answers for 1951.

If you haven't used a Record Book during the past year and you want to avoid numerous headaches in 1953, why don't you give the Sylvania Business Record Book a try. It is the easiest way to keep your books. It was designed especially for radio servicemen by a former tax expert.

Each day you can account for the money you receive and the money you put out. You can tell instantly how much you spend for overhead expenses, how much you pay in taxes, the exact amount of your cost of doing business.

Each month of the year you can tell your cash balance and your financial position. Included in the book is a year-end profit and loss statement which will save you trouble in filling out income tax forms.

Get a copy of the Sylvania Business Record Book today. It costs only \$1.00. Pick it up at your Sylvania Distributor or from the Advertising Dept., Sylvania Electric Products Inc., Emporium, Pa.



New Fluorescent Electric Sign Is A Real Attention Getter

Sylvania's new fluorescent electric sign does the best job yet of telling your old and potential customers what you do. Especially designed for a long, bright life, with a sturdy metal gray hammertone finish case, this attention getter has a terrific new feature—a brilliantly lettered *plastic* front that protrudes 1½" from the metal portion of the sign. What you do and the quality materials that you use pop right out and catch the eye of the passerby.

This fluorescent electric sign sells your service day and night. It has a yellow background with red and black letters and comes complete with fluorescent lamps. Size 24¾" x 8¾" x 5¾".

The Advertising Dept., Emporium, Pa., will send you this impressive sign postpaid for \$8.95. Why not send for yours today and let it start working for you?

SYLVANIA NEWS

SYLVANIA ELECTRIC PRODUCTS INC.

P. O. BOX 431

EMPORIUM, PENNSYLVANIA

For

J. A. Renville
153 Main St.
Luzerne, Pa.

Form 3547 Requested

Vol. 19, No. 1

PUBLISHED BY

SYLVANIA ELECTRIC PRODUCTS INC.

MANUFACTURERS OF SYLVANIA RADIO TUBES, CATHODE RAY TUBES, ELECTRONIC DEVICES, FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, ELECTRIC LIGHT BULBS, PHOTOLAMPS, RADIO AND TELEVISION RECEIVERS.

JANUARY 1952

Sec. 34.66 P. L. & R.
U. S. POSTAGE
PAID
Permit No. 1
Emporium, Pa.

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In This Issue

NEWS
SYLVANIA WEEK IN OKLAHOMA

MERCHANDISING
THE MOST EXPENSIVE CAMPAIGN
IN RADIO PARTS HISTORY

TECHNICAL
TV SET SERVICING
WITH AN OSCILLOSCOPE

SYLVANIA NEWS

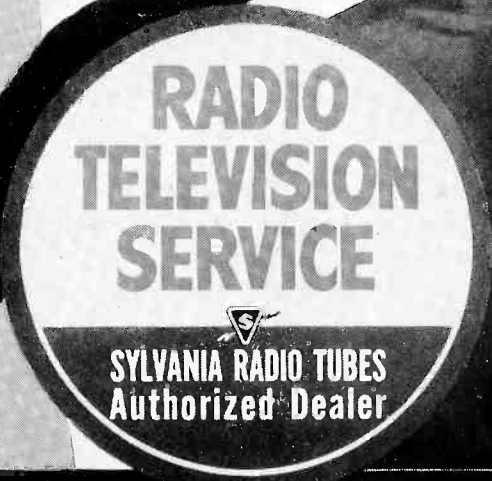
FEBRUARY 1952



Jane Russell says:

"YOU'LL FIND THE BEST IN RADIO AND TELEVISION SERVICE... "

Right Here



C. J. Lutten, editor
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Sylvania Electric Products Inc.
Vol. 19, No. 2

We use SYLVANIA Radio and Television Tubes

NOW . . . SYLVANIA DISTRIBUTORS WILL BUY YOUR USED PICTURE TUBES

Radio - television service dealers may now obtain a **GLASS ALLOWANCE** worth from \$2.25 to \$5.25 for popular types of used television picture tubes of *any* make. You get this credit from your authorized Sylvania Picture Tube Distributor—the man from whom you obtain new, high-quality and fully-guaranteed Sylvania Picture Tubes for replacement installations. The process is simple, there are no strings attached.

Here's all you do:

1. You will receive a **GLASS ALLOWANCE** credit of from \$2.25 to \$5.25 toward the purchase of any new Sylvania picture tube, for each used picture tube of specified types returned to your Sylvania distributor.

2. Returned tubes may be of *any* make, provided they are among the popular *types specified by us*.

3. The purchased tube need not be of the same type returned, but may be *any Sylvania type* our distributor has for sale.

4. *Current cash values* of your **GLASS ALLOWANCES**, as recommended by Sylvania, and *currently eligible types* are shown on the enclosed Suggested Dealer's Glass Allowance Price List, shown in the box below.

5. Only tubes under vacuum, and free from glass defects such as scratches, chips, bruises and other indications of physical abuse, are qualified for **GLASS ALLOWANCE**.

All tubes returned will be inspected by your distributor for these conditions.

6. Due to fluctuating market conditions, tube types eligible for **GLASS ALLOWANCE** and the Dealer's Glass Allowance Prices are subject to change, additions and deletions. Your Sylvania distributor will be kept fully informed at all times.

Sylvania's primary manufacturing policy for 50 years has been highest quality of product. We consider the serviceman to be the final link in our program chain for maintaining this quality. As a leader in the field of service-dealer cooperation, we feel it only natural to bring you this **GLASS ALLOWANCE** program, with these objectives:

1. To increase your profit for picture tube sale by from \$2.25 to \$5.25 while at the same time permitting you to protect your reputation by installing only new, fully guaranteed Sylvania picture tubes in your customers' receivers.
2. To provide you with a convenient and profitable market for used picture tubes, through the same cooperative Sylvania distributor who supplies you with new Sylvania tubes and many of your other supplies.
3. To put new Sylvania Picture Tubes on a competitive basis with other tubes being sold in your area.

THAT'S ALL THERE IS TO IT! Your Sylvania Distributor is ready to go. **YOU** can start **NOW!** **TODAY**, contact your distributor, and find out how quickly and easily old picture tubes on hand *plus* most tubes you replace in the future can be converted to extra profit immediately, by trading them in for Sylvania's **GLASS ALLOWANCE** credit.

Suggested Dealers' Glass Allowance Price List

| | | | |
|------------------|--------|------------------|--------|
| 12KP4A | \$2.25 | 17JP4 | \$2.25 |
| 12LP4A | 2.25 | 17KP4 | 2.25 |
| 12VP4 | 2.25 | 17LP4 | 2.25 |
| 16JP4A | 3.25 | 17QP4 | 2.25 |
| 16KP4 | 3.25 | 17RP4 | 2.25 |
| 16KP4A | 3.25 | 17SP4 | 2.25 |
| 16LP4A | 3.25 | 20CP4 | 4.25 |
| 16QP4 | 3.25 | 20CP4A | 4.25 |
| 16RP4 | 3.25 | 20DP4 | 4.25 |
| 16TP4 | 3.25 | 20DP4A | 4.25 |
| 16UP4 | 3.25 | 20FP4 | 4.25 |
| 16XP4 | 3.25 | 20GP4 | 4.25 |
| 16ZP4 | 3.25 | 20HP4 | 4.25 |
| 17AP4 | 2.25 | 20HP4A | 4.25 |
| 17BP4 | 2.25 | 20JP4 | 4.25 |
| 17BP4A | 2.25 | 21EP4 | 5.25 |
| 17BP4B | 2.25 | 21EP4A | 5.25 |
| 17FP4 | 2.25 | 21FP4 | 5.25 |
| 17FP4A | 2.25 | 21FP4A | 5.25 |
| 17HP4 | 2.25 | 21KP4 | 5.25 |
| | | 21KP4A | 5.25 |

The above tube types and prices are subject to change without notice.

NATIONAL SERVICE ORGANIZATION PRESENTS SYLVANIA WITH AWARD "FOR GREATEST SERVICE RENDERED BY ANY INDUSTRY MANUFACTURER"



Frank J. Moch, left, of Chicago, President of National Alliance of Television and Electronic Service Associations, presents Sylvania President Don Mitchell with a plaque representing NATESA's first annual "Friends of Service Management" industry award. Looking on, from left to right, are B. K. Wickstrum, Vice President and Director of Sales for Sylvania, Terry P. Cunningham, Sylvania Director of Advertising and Sales Promotion, and Russell G. Cummings, of Boston, Eastern Vice President of NATESA.

The National Alliance of Television and Electronic Service Associations recently presented its first annual "Friends of Service Management" industry award to Sylvania.

In a brief ceremony at Sylvania's executive headquarters in New York (see photo above), Frank J. Moch, President of NATESA, handed a plaque symbolizing the award to Sylvania President Don G. Mitchell. The industry award to Sylvania was voted at NATESA's first annual convention in Chicago a short time ago.

The Alliance, founded a little over a year ago, is made up of local television service company associations of 25 leading American cities from coast to coast. Its aims are to build up public confidence in qualified television service companies, to discourage patronage of unqualified or unscrupulous persons in the servicing field, to create an understanding of reasonable service costs, and to improve relations with other elements of the radio-television industry.

The Alliance cited Sylvania "for the

greatest service rendered by any industry manufacturer" to the cause of the serviceman in 1951 and for having demonstrated "on numerous occasions a fine realization of its responsibilities and consideration for other segments of the industry and public, particularly its fine program commercials portraying the true position of service."

The commercials on Sylvania's *Beat the Clock* television program frequently have been devoted to assuring the public that trained, competent servicemen are available in every community, and urging set owners to seek out and patronize these men—dealers who display the Sylvania emblem—to insure satisfactory service.

In accepting the award for Sylvania, Mr. Mitchell pointed out that "Sylvania's primary manufacturing policy for 50 years has been highest quality of product."

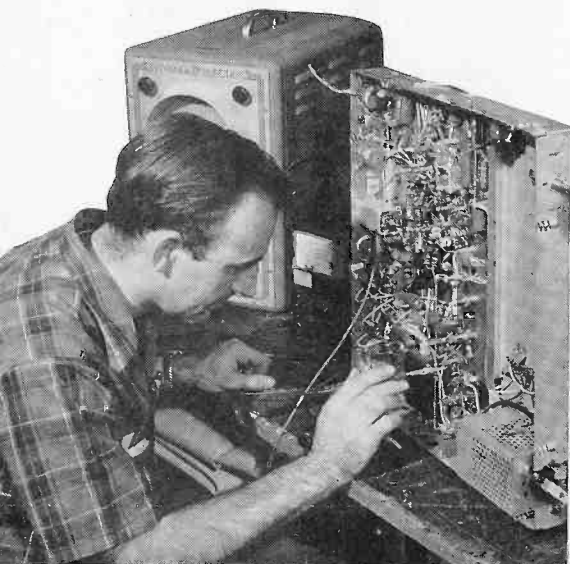
"Even finished products and components of the best workmanship are subject to wear and exhaustion, however, and must be restored to

perfect working order," he added. "For that reason, we consider the serviceman to be the final link in our program chain for maintaining quality.

"As one of the largest manufacturers of replacement tubes for television and radio sets, we have had ample opportunity to study the service field, and we know that today we can have the utmost confidence in the trained serviceman. Therefore, I am proud to accept this award from the Alliance and, in return, to assure its members that Sylvania will continue to support the cause of competent, conscientious servicemen."

Among Sylvania executives present at the ceremony were B. K. Wickstrum, Vice President and Director of Sales; George R. Sommers, General Sales Manager of Radio Tube Division; H. H. Rainier, Sales Manager, Distributor Tubes; and Terry P. Cunningham, Director of Advertising and Sales Promotion. Representing NATESA with Mr. Moch was Russell G. Cummings, Eastern Vice President.

SAFETY REGULATIONS IN HANDLING TELEVISION PICTURE TUBES ADOPTED



No serviceman is unaware of the great hazards involved in the handling of TV picture tubes. An accidental tap with a screw driver against the tube, for instance, may be enough to crack it and set off an implosion of dangerous proportions.

Bob Van Sicklen, Safety Representative at Sylvania Center in Bayside, N. Y., recently prepared a new list of safety rules for the protection of all that should be interesting to any servicemen who repairs TV sets. Here it is:

1. Tubes should be kept in their shipping containers or in cabinets having protective barriers adequate to contain flying glass in case of breakage.

2. When tubes must be handled, wear protective clothing including goggles or face shield and gloves or where a tube is mounted on an open chassis, the tube should be covered at all times with a layer of heavy canvas.

3. A tube should be inserted or withdrawn from a carton in such a way that the face is toward the end of

the carton through which the tube passes.

4. A tube should never be grasped by the neck nor should force be exerted on the neck. One method of handling a tube properly is to grasp the tube at the base of the cone, where the cone joins the neck. The other hand can be placed on the rim of the face plate or the base end of the neck. This hand will not carry any weight but will aid in balancing the tube.

5. If a tube must be laid on a flat surface it must never be laid on its side; it should be placed vertically on its face and on a soft pad, free of abrasive substances.

6. If tubes are to be destroyed they should be broken in a closed can with a small hole through which a plunger is passed, or in a sealed carton through which a heavy instrument such as a crossbar can be driven.

7. Cathode Ray Tubes are operated at voltages which are high enough to be dangerous. Adequate precautions should be taken to avoid contact with such voltages.

At left is Raymond Zitta, a Sylvania television technician, working on a television set at Sylvania Center, Bayside, New York.

Seattle's Stateside Radio-Television Company Makes Impatient Customers Happy With Flexible TV Service Charge System

Everybody wants prompt TV service. That is one of the problems of every successful service business. Here is how Ed D. Sablin, owner of Stateside Radio-Television Company of Seattle, solved the problem to his and his customers' satisfaction.

Recognizing that few patrons realize the cost of immediate service, Sablin established a graduated rate structure "tailored to meet individual needs." He told the public about these sliding rates in an ad in the *Seattle Times*.

"Yes . . . we're sticking our neck out," the ad was headlined (a picture of a giraffe emphasized an awkward

neckline position). "But the longer you wait the shorter your bill," it continued. There followed an explanation of why service charges were based upon time allowances made by customers.

"Our accountant discovered that if we used our original system of charging for labor, we will:

1. Increase our profits by more than 20%—which means savings passed on to you.
2. Increase our production capacity at least 20%—which means more work for us—and lower costs to you.
3. Increase "effective" overall effi-

ciency by at least 25%, perhaps even 50%—and efficiency means time—and time in any man's language means money!"

The promise of savings made readers look further. "Stateside's original labor-saving service, saves you money and gives more listening and viewing pleasure. We feel that labor and service charges should be tailored to fit the individual job, and so:

1. If you desire immediate service within 24 hours, add 20% to our estimate.
2. If you desire service between

(Continued on page 11)

T V SERVICING WITH AN OSCILLOSCOPE

PART II *By J. S. Allen, Advanced Application Engineer*

In the first article of this series (see January NEWS) we observed the voltage waveforms that may be found in the deflection circuits of most present day television receivers.

In this article, we will consider the video and sync sections of the receiver. It seems desirable to begin with the video section since the sync information is derived from the composite video signal which is applied to the picture tube.

In the discussion to follow, Figures 1 through 8 are photographs* of waveforms appearing on the face of a wideband oscilloscope. The composite video waveform, Figures 1 and 2, may be viewed either at the grid or plate of the video amplifier tube. As noted in the previous article, their appearance will depend on the bandwidth of the observer's oscilloscope. Furthermore, noise may be present which will add a certain

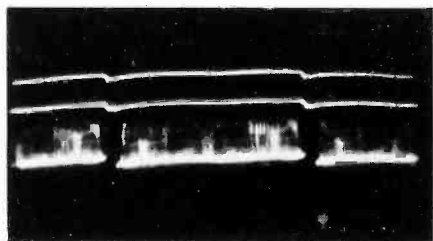


Fig. 1—Composite Video Signal. Scope Sweep @ 30 cps (2 fields).

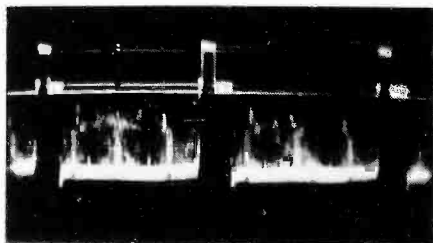


Fig. 2—Composite Video Signal. Scope Sweep @ 7875 cps (2 lines).

*Photographs by the author

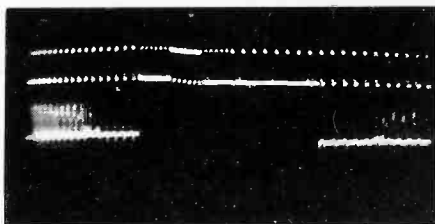


Fig. 3—Vertical Blanking Interval.

amount of "fuzz" which does not appear here. Figure 1 is obtained with the 'scope sweep set at 30 cps and shows two fields with the vertical sync and blanking interval between the picture information. Figure 2 is obtained with the 'scope sweep at 7875 cps and shows two lines with horizontal sync and blanking between. Figure 3 is an expansion of Figure 1, in which the components of the signal appearing during the vertical blanking interval are more readily identified. (This presentation is *not* normally obtainable on service oscilloscopes.) Here we see: (a) the video information corresponding to the last few lines at the bottom of the picture; (b) a period of about five lines during which no picture information is present; (c) vertical blanking begins and continues for a period of 833 to 1333 microseconds. During this period, vertical synchronizing and interlace information is transmitted and appears on top of the blanking pedestal. Here we see, in order, six equalizing pulses occurring at 31500 cps or twice line frequency, the serrated or notched vertical sync pulse, six more equalizing pulses and, finally, horizontal sync pulses until unblanking occurs and picture information at the top of the picture begins. Equalizing pulses are provided in order to maintain proper interlace of the lines of

each field. The sync pulse, when suitably operated upon, is used to make the electron beam in the picture tube return to the top at the proper time. The blanking pulse on which the sync information lies is provided so that the picture tube will be blanked out during the time the beam returns and the retrace lines will not be visible.

Similarly, Figure 4 is an expansion of Figure 2 in which we see a horizontal sync pulse on top of the horizontal blanking pedestal. Video information is observed for the end of one line and the beginning of the next. Preceding and following the

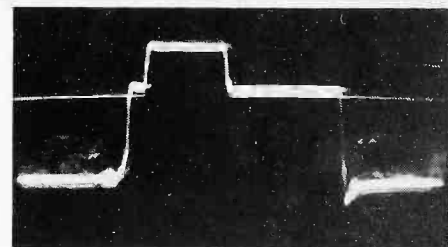


Fig. 4—Horizontal Blanking Interval.

sync pulse are the so-called "front porch" and "back porch" in the horizontal blanking interval. It is interesting to note in passing that, in the proposed system of compatible color television, the color synchronizing information is placed on the "back porch" following the horizontal sync pulse and consists of about 9 cycles of a 3.89 mc sine wave.

The horizontal blanking and sync have equivalent purposes, as far as getting the electron beam from right to left is concerned.

It may be of interest to describe briefly the manner by which the composite signal is produced. We shall concern ourselves here with

(Continued on next page)

the monoscope "Indian Head" test pattern. The picture information is produced by a monoscope tube which contains a metal plate on which the pattern is printed. The plate is scanned by an electron beam and, because of the different secondary emission characteristics of the printed and unprinted parts, a voltage is produced on the metal plate which varies in accordance with the printing. This voltage is amplified and, when at a satisfactory level, the blanking pulses are mixed with it. These pulses, as produced in the signal generator, are shown in Figures 5 and 6. Finally, sync pulses (Figures 7 and 8) are added to the blanked picture signal and the composite video signal is complete, as shown in Figures 1 and 2. (Note that in Figures 1 and 2, white is at

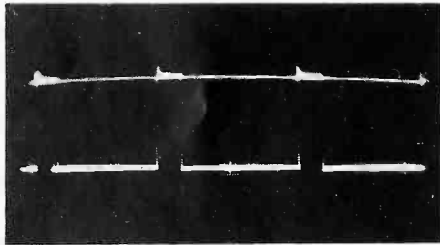


Fig. 5—Horizontal Blanking Pulses.

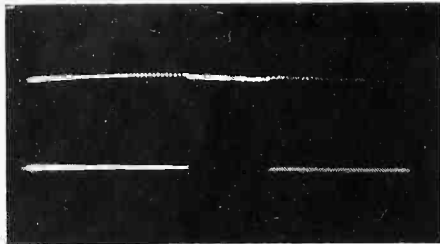


Fig. 6—Vertical Blanking Pulse.

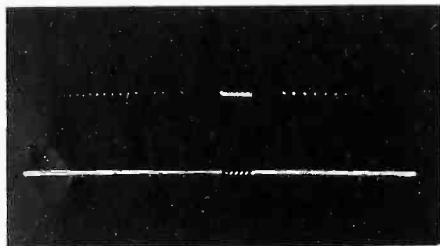


Fig. 7—Vertical Sync & Equalizing Pulses.

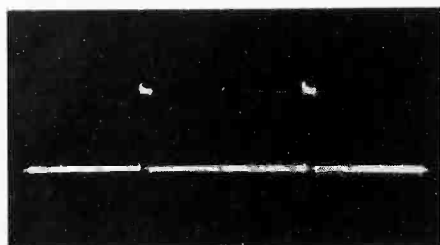


Fig. 8—Horizontal Sync Pulses.

the bottom and black is at the blanking level. Thus, the sync information lies in the so-called "blacker than black" region and, therefore, is not visible in the picture as viewed on a receiver.)

To continue to the sync section of the receiver, it is here that the synchronizing information is stripped from the composite video waveform and, by various manipulations, is used to control the frequency of the horizontal and vertical deflection systems. It is difficult to give definite waveform information here, because receivers exhibit such diverse circuitry in this section. Some receivers employ separate vertical and horizontal sync separator tubes. In such cases, observation of the signal at the plates of these tubes will show pulses in which the predominant one will be at vertical or horizontal scanning frequencies respectively. If the signals are followed through the receiver, it will be observed that the horizontal pulses are practically removed from the vertical sync signal and vice versa. The vertical sync pulse is ordinarily separated from horizontal pulses by an integrator, a particular arrangement of resistors and capacitors that responds only to the serrated vertical sync pulse and

not to either the horizontal sync pulses or equalizing pulses. Conversely, horizontal sync pulses are obtained by differentiation, whereby only the sharp rise and fall at the beginning of the sync pulses is recognized by the circuit. A number of television textbooks will supply more complete information on the action of integrator and differentiator networks than can be included herein.

In receivers employing a single section for separation of both horizontal and vertical sync, the output of the sync separator will appear to be just the portion of the signal above the black level of the composite video signal. If this signal is followed, it will be seen that the same operations are eventually performed with complete separation of vertical and horizontal sync, one from the other.

For the information of interested camera fans, we are including the data on the waveform photographs. These were made at 10 seconds exposure at f/4.5 on Plus X film, developed in D-76 for the recommended time. The scope brightness was set at a normal intensity for viewing in a darkened room and was not so bright as to produce a halo around the pattern or to unduly illuminate the rest of the cathode ray tube screen.

Type 139-140 Tube Tester Correlation Chart

The table below will enable one to correlate actual tube pin numbers with settings of any of the switches on the Type 139-140 tube tester panel.

| Socket | Pin Numbers | | | | | | | | |
|-----------------|-------------|---|---|--------|---|--------|---|---|---|
| Noval | 5 | 1 | 2 | 6 | 9 | 3 | 7 | 4 | 8 |
| Lock-in | 8 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | |
| Octal | 7 | 3 | 4 | 5 | 1 | 6 | 8 | 2 | |
| Seven Pin | 1 | 2 | 3 | 4 | - | 5 | 6 | 7 | |
| Acorn | 1 | 2 | 3 | 4 | 5 | Center | 7 | 6 | |
| Six Pin | 1 | 2 | 3 | 4 | - | - | 5 | 6 | |
| Five Pin | 1 | 2 | 3 | - | - | - | 4 | 5 | |
| Four Pin | 1 | 2 | 3 | - | - | - | - | 4 | |
| Miniature Seven | 3 | 2 | 1 | 7 | 5 | 6 | - | 4 | |
| Bantam | 1 | 2 | 3 | Center | - | - | 4 | 5 | |

Switch

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|---|
| B | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| C | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8* | 9 |
| D | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 8 |
| E | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| F | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

To locate socket and switch connections, pick out correct socket; go across to pin number, go down to switch desired and read position. E.g.: Octal socket pin four connects to D switch at position five.

*Function of C and neutral are interchanged in this position. E.g.: To disconnect at this position the switch is left in neutral.

ADDITIONAL COIL DATA FOR THE LOW NOISE RF AMPLIFIER

In response to many requests from readers for coil data for particular tv channels for the low noise rf amplifier described in the November issue of SYLVANIA NEWS, the following table of coil data has been prepared. Data for the fm band is also included. The bandwidth is not wide enough to cover the entire 20 mc band, so the booster should be tuned to that part of the band of most interest. A few precautions which should be

observed in building such a booster are given below.

1. Keep all rf leads as *short* as possible.
2. Put the input and output coils as far apart as possible and keep the input and output leads separated.
3. Connect the grid and plate to the top of the coils and keep the tuning slug in the bottom or

ground end of the coils. If necessary, space the turns for the required inductance.

4. Adjust the inductance of the self-supporting coils by varying the spacing.

A signal generator should be used to align the booster. For best stability, it is desirable to ground the center tap of L_1 and L_5 , the input and output coils.

COIL DATA FOR LOW NOISE RF AMPLIFIER USING TYPE 6BQ7 TUBE

LOW CHANNELS CONSTRUCTION DETAILS

| | L_1 | L_2 | L_3 | L_4 | L_5 | L_N | RFC |
|---------|---|--|---|--|---|---|---|
| | #24E wire interwound on ground end of L_2 . Center tap L_1 and ground the center tap. | #24E wire on $\frac{5}{16}$ " diam. form. Iron slug tuned. | #20E wire close wound self-supporting coil of $\frac{3}{4}$ " diam. | #24E wire on $\frac{5}{16}$ " diam. form. Iron slug tuned. | #24E wire interwound on ground end of L_1 . Center tap L_5 and ground the center tap. | #24E wire close wound self-supporting coil of $\frac{1}{4}$ " diam. | #20E wire space wound self-supporting coil of $\frac{1}{4}$ " diam. |
| Channel | (Number of Turns) | | | | | | |
| 2 | 4 | 12 | 18 | 20 | 5 | 37 | 12 |
| 3 | 3½ | 11 | 16 | 18 | 4½ | 33 | 12 |
| 4 | 3½ | 10 | 14 | 16 | 4½ | 29 | 12 |
| 5 | 3 | 9 | 12 | 14 | 4 | 23 | 12 |
| 6 | 3 | 8 | 11 | 12 | 3½ | 20 | 12 |
| FM | 3 | 7 | 9 | 10 | 3 | 16 | 12 |

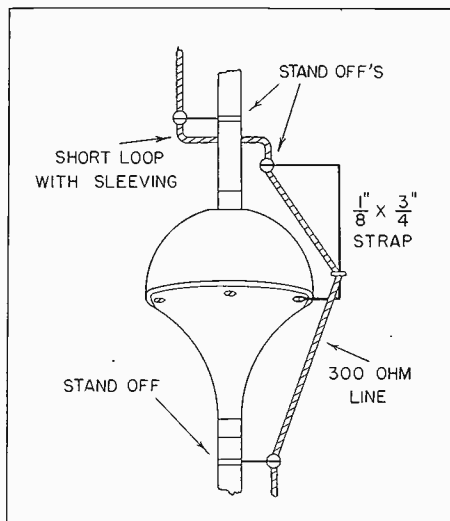
COIL DATA FOR LOW NOISE RF AMPLIFIER USING TYPE 6BQ7 TUBE

HIGH CHANNELS CONSTRUCTION DETAILS

| | L_1 | L_2 | L_3 | L_4 | L_5 | L_N | RFC |
|---------|---|--|--|--|---|--|---|
| | #24E wire interwound on ground end of L_2 . Center tap L_1 and ground the center tap. | #20E wire on $\frac{5}{16}$ " diam. form. Iron slug tuned. | #20E wire space wound self-supporting coil of $\frac{3}{16}$ " diam. | #20E wire on $\frac{5}{16}$ " diam. form. Iron slug tuned. | #24E wire interwound on ground end of L_4 . Center tap L_5 and ground the center tap. | #24E wire space wound self-supporting coil of $\frac{3}{16}$ " diam. | #20E wire space wound self-supporting coil of $\frac{1}{4}$ " diam. |
| Channel | (Number of Turns) | | | | | | |
| 7 | 2½ | 4¼ | 9 | 5 | 1¼ | 12 | 5 |
| 8 | 2¼ | 4 | 8½ | 4¾ | 1 | 11½ | 5 |
| 9 | 2¼ | 3¾ | 8 | 4½ | 1 | 11 | 5 |
| 10 | 2¼ | 3¾ | 8 | 4¾ | 1 | 11 | 5 |
| 11 | 2 | 3½ | 7 | 4 | ¾ | 10 | 5 |
| 12 | 2 | 3½ | 7 | 4 | ¾ | 10 | 5 |
| 13 | 2 | 3½ | 7 | 4 | ¾ | 10 | 5 |

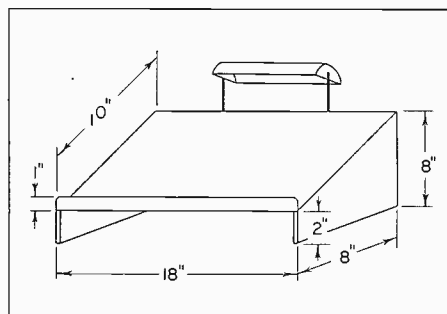
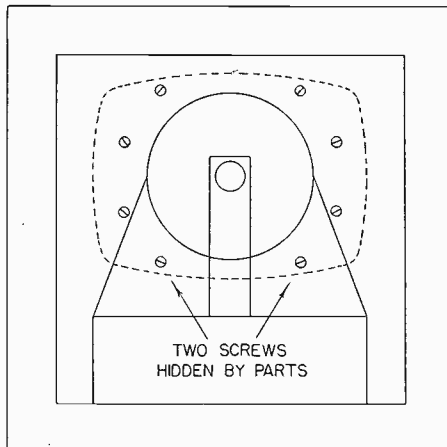
Service Hints

ANTENNA ROTATORS—After using several rotators on antenna installations, I have found that, sooner or later, the 300 ohm transmission line will become broken in the loop. This condition is due to the loop hanging on bolts, etc. I have devised an apparatus (see sketch below) which has eliminated this trouble on the Tele Rotor. (It should work equally well on other rotators of similar style and construction.)—M. M. Tarpley, Temple, Texas.



GENERAL ELECTRIC MODEL 12T7—To simplify the job of cleaning the tube face and protective glass mask on this and similar models, leave out the two bottom screws that are hidden by the chassis and tube. The remaining six screws can be removed without removing the chassis and tube supporting brackets. This makes periodic cleaning of the tube face a minor task. The present method usually means a complete repositioning of the picture due to the shifting of the picture tube during

removal of the chassis.—M. DeCamillis, Detroit, Mich.

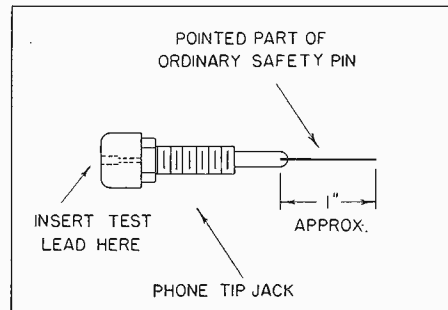


SERVICE MANUAL LECTERN — A service manual lectern or holder for the service bench, with a light attached for easy reading of service notes, etc., will not only serve as a convenience to the serviceman, but will also help keep the manual clean. The holder, illustrated above, is similar to the type used by ministers and other speakers. To my model, I added an 8-inch fluorescent lamp, held by simple brackets

which may be easily made by the serviceman.

The stand may be made with soft pine, the top and lip with masonite or ½-inch plywood. The base of the stand may be modified to suit the individual, though suggested dimensions are indicated.

—J. P. Torre, Brooklyn, N. Y.



PHONE TIP JACK ADAPTER—This adapter is especially useful when making voltage measurements on radio and television receivers from the top of the chassis. Many current models use both octal and seven or nine pin sockets and ordinary test prods will not go into the smaller pin holes. By using the adapter (illustrated above) the serviceman may leave the same test leads in his test instrument. All he has to do is insert the phone tip jack adapter and he's ready for his next check, even though it may involve a different type socket.

I made two such adapters with ordinary phone tip jacks and the pointed sides of two safety pins.—J. P. Torre, Brooklyn, N. Y.

EMERSON TV 118 B OR C SERIES, 12½\"/>

RCA MODEL T-121—No picture, no raster. Sound okay. Trouble found: a shorted ceramic condenser leaking from sound trap of 4th pix if amplifier. This short prevented picture if signal from reaching picture tube amplifier.—J. P. Torre, New York City.

HORIZONTAL RUNNING AND PULLING when changing stations (where a synchro lock or synchro guide circuit is utilized). Proper setting of sync to lock on changing from channel to channel requires a very simple procedure not known to many servicemen. The phasing coil is in effect a key which when shorted permits setting the horizontal oscillator coil to the required frequency. Adjust until frame of pix locks fully. Remove shorting jumper from phasing coil and adjust phase coil until pix locks in opposite direction. Turn from station to station. If pix still runs repeat operation. Continuous running means trouble in horizontal section. Find same and repeat to lock.—Harry Ringel, New York City.

Your SERVICE HINT Is Worth FIVE DOLLARS

Sylvania will send you a certificate worth five dollars towards the purchase of any advertising item listed in our "Multiplying Pennies" booklet for your latest service hint, if the editors of SYLVANIA NEWS find it acceptable for publication.

Send your service hints to:

SYLVANIA ELECTRIC PRODUCTS INC.
 Technical Publications Section Emporium, Pennsylvania

MERCHANDISING SECTION

FEBRUARY 1952 Vol. 19, No. 2

Jane Russell says:
"YOU'LL FIND THE
BEST IN RADIO
AND TELEVISION
SERVICE..."

Right Here



We use SYLVANIA
Radio and Television Tubes

Last month Sylvania announced that in 1952 it would spend more money than ever before to advertise the radio-television service dealer's business in national magazines and on television. It must be remembered, however, that all of this advertising will do you little good unless you use Sylvania's Local Advertising Campaign Kit. Only with the material in this kit can you *completely identify yourself as the dealer recommended in Sylvania's national advertising* and take advantage of the money that is being spent to help you.

Jane Russell, Leo Durocher and Laraine Day will tell your prospects

through ads in *Life*, *Saturday Evening Post*, *Collier's*, and *Better Homes & Gardens* to look for the service shop which displays the Sylvania emblem. That means *you* if you have that emblem in your window, on your door, and on your truck.

through ads in *Life*, *Saturday Evening Post*, *Collier's*, and *Better Homes & Gardens* to look for the service shop which displays the Sylvania emblem. That means *you* if you have that emblem in your window, on your door, and on your truck.

Sylvania emblems come free with your spring advertising campaign kit. And that's only the beginning. Jane Russell, popular movie star, works for you during March. Your kit includes a beautiful two-by-three window display of Jane. She looks here just like she does in those eye-popping national magazine ads. Your Sylvania emblem and Jane will remind anybody passing by your store that you are the man she recommends for fine workmanship and quality materials at a fair price. A terrific

26-inch window streamer tells the same story. A six-color card of Jane for your counter helps promote your business to people who enter your shop.

There are also Jane Russell stamped postal cards for March mailing. This three-color government postal card, imprinted with your store name, address, and phone number will impress all the prospects in your neighborhood that you are the service dealer Jane endorses. Note that the new 2c postal card stamp is already on the card when you receive it from Sylvania.

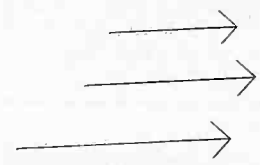
There is a special television tube

Leo Durocher and Laraine Day Say:
"Look for this sign..."
OUR RADIO AND TELEVISION SERVICE WILL GIVE YOU COMPLETE SATISFACTION

Leo Durocher says:
"BE SURE YOU GET EXPERT RADIO OR TV SERVICE -
Stop Here..."

RADIO TELEVISION SERVICE
SYLVANIA RADIO TUBES Authorized Dealer

We use SYLVANIA
Radio and Television Tubes



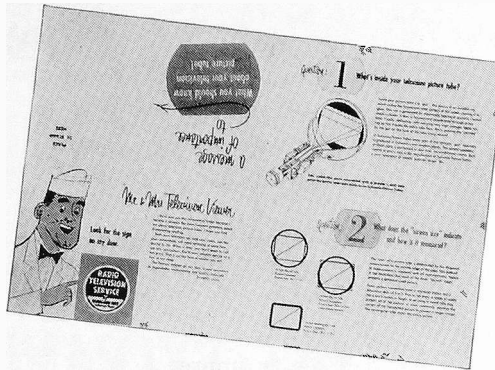
folder in the campaign kit for April mailing. It's a completely new mailing folder that every one of your prospects will read. It answers the seven most frequent questions they ask about picture tubes. This mailer is also imprinted with your store name, address, and phone number. It comes to you all folded and sealed, ready to address, stamp, and mail. All the answers to the picture tube questions recommend you as the right man to see for a new tube or for service of any kind.

In May and June, right at the height of the baseball season, Leo Durocher, baseball's "Manager of the Year," and his lovely movie star wife, Laraine Day, will appear in your window in a three-foot, six color display. An 18-inch counter card will bring Leo's hard-hitting recommendation of your business right to your point-of-sale. A big, colorful window streamer of Leo and Laraine will be a real sidewalk eye-catcher and convincer.

The third handsome mailer in your local advertising campaign kit is a postage-paid, three-color postal card featuring Laraine Day's plug for your expert service. Of course, your store name, address, and phone number as well as the Sylvania emblem are prominently printed on it.

A timely giant post card of Leo Durocher will boost your June sales. How many of your customers have seen the confusing underside of a TV chassis? This giant mailer shows it to them with four big reasons why only an expert like you should handle their service. It is imprinted with your name, address, and phone number and is ready for your 2c stamp.

In addition your kit will contain reminder stickers to go on all the sets you service, and a 60-page book of radio spot announcements. And, of course, there are the all-important Sylvania Radio - Television Service Emblems printed in fluorescent inks. Night or day your store's identification with Sylvania's tremendous national advertising is positive and sure with these glowing decals. They shine brilliantly whenever sunlight or artificial light falls on them. Lithographed in six fluorescent colors,



These mailing pieces will bring you more profits this spring. Order your Sylvania Advertising Campaign Kit today.



they attach permanently to your windows, door, or truck. Both eight and twelve-inch sizes come free in your Sylvania advertising campaign kit.

Now how much does all of this advertising cost? Only 2c each for the mailing pieces you order. And remember, two of the four mailing pieces furnished in this kit have 2c postage already attached.

Plain government postal cards you buy from the post office now cost you 2c each. If you do any direct mail advertising at all, that 2c per card is your minimum cost. Yet here is a complete campaign of six-color displays, three color streamers, colorful imprinted mailers, stickers, emblems, and radio spots available to you at the same price you would pay for plain postal cards at the post office.

Here's how you figure the cost of this campaign to you:

1. Count the number of names on your mailing list, or list of customers.
2. The number of names on your mailing list times 8 cents equals the cost to you (in cents) of this whole advertising campaign. There are four mailing pieces—one for each month . . . March, April, May, and June. Each costs two cents. You'll want each card to go to each name on your list. For instance, if you have 200 prospects on your list, your kit will cost \$16.00; 100 prospects means a kit for \$8.00.

There are no other charges. All the rest of the material is furnished free by Sylvania. Who could ask for a more inexpensive way to promote his business and earn more profits?

If you desire more information about this tremendous campaign, see your Sylvania Distributor or write the Advertising Dept., Emporium, Pa.

Mr. Service Dealer:
 Did you know . . .
 98% more television sets are in use in your service area today than were two years ago?
 Are you making TWICE your 1950 profits from TV service?
 Did you know . . .
 As many radios are in use in your service area today as were in use two years ago?
 Are you making *as much profit from radio service* as you were in 1950?
 Question: If you're not making these additional service profits in your area, *who is*?
 Answer: Your **COMPETITOR**—the man who is consistently advertising his radio-TV service to your prospects.
 Question: What can you do about it?
 Answer: *Right now* start using Sylvania's 1952 Advertising Campaign for Radio-TV Service Dealers. It's the *hardest-hitting, most complete, least expensive advertising program* you can buy.

LOW COST ADDRESSER MAKES MAILING ADVERTISING PIECES EASY

"I'd like to use more direct mail advertising," says many a radio-television service dealer, "but I don't have time to address it each month."

This well known problem has a solution . . . the Master Addresser, a relatively inexpensive addressing machine which makes mailings an easy matter. The Master Addresser is a small, low cost automatic addressing machine designed to simplify the mechanics of mailing promotional material to prospects. It is simple to operate, easy to maintain. Once the names and addresses of prospects have been recorded on the addressing tape, mailings can be prepared in very little time. And best of all, the investment in the equipment is small enough to be paid for in time saved after a very few mailings. The model shown at right is, for example, only \$52.17; and it may be paid for in convenient installments.

Some of the features of the Master Addresser which will appeal to service dealers are:

1. Its Flexibility. The Master Addresser will print addresses on any size envelope, post card, folder, statement and other commonly used mailing pieces.

2. Speed. Addresses can be printed

as fast as mailing pieces can be inserted. The tape is advanced automatically from one address to the next.

3. Prints, from easily prepared master tape by the spirit duplication process. The fluid supply is governed by a metered control which allows more and better impressions.

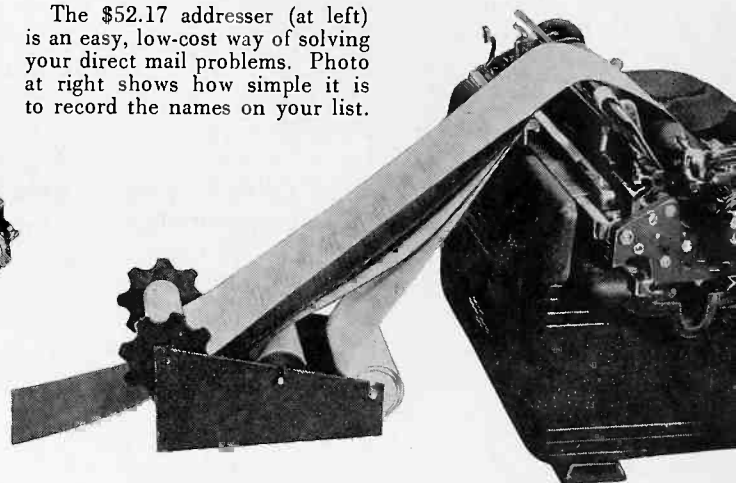
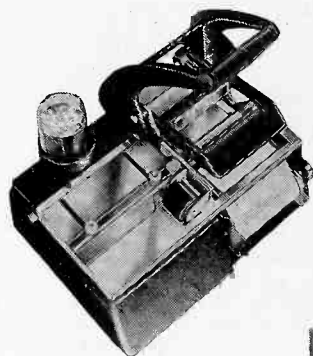
4. Selective Addressing. Names can be read before imprinting. If the name is not wanted, it can be omitted.

5. Simple to Operate. Just insert the mailing piece, and press the handle.

6. Compact and Portable. The Master Addresser weighs only 10 pounds and requires no heavy filing equipment.

This simple - to - use addressing machine will solve many problems for any dealer who wants to build his business by direct mailings to his prospects. Use the Master Addresser with the Sylvania campaign kit and more business will come to you with very little effort. For complete information, write directly to Edward Ochman, 116 Granville Street, Fairfield, Conn.

The \$52.17 addresser (at left) is an easy, low-cost way of solving your direct mail problems. Photo at right shows how simple it is to record the names on your list.



Seattle's Stateside Radio-Television Company

(Continued from page 4)

24 and 48 hours, add 10% to our estimate.

3. If you desire service between 48 hours and 5 workdays, our regular charge and estimate to you is effective.

4. IF YOU DESIRE SERVICE BETWEEN 5 DAYS TO 10 DAYS, DEDUCT 10% FROM OUR ESTIMATE.

5. IF YOU DESIRE SERVICE ANYTIME AFTER 10 DAYS, DEDUCT 20% FROM OUR ESTIMATE! (When you come in, specify which schedule you wish.)" So far, the text was fine. Still—

some skeptics might question elasticity of the word "estimate" which recurred in each of the five rates. To eliminate all guesswork, Mr. Sablin tabled *estimates* as follows:

"If parts removed from cabinet, minimum charge 50c. All table model radios and phonographs left for estimates will be repaired if the cost is less than \$5. If repair charges will be more, we will verify with you as to the amount and receive your okay. Console models will be repaired if under \$12.50, otherwise we will consult you first. Stateside's regular charges are \$5 per hour for radio and \$5.75 per

hour for TV. These are basic minimum rates, association and manufacturer approved."

Mr. Sablin, commenting on the ad said, "It was run solely to acquaint people with the facts. We did not expect it to produce service calls but it did."

Readers, puzzled over the unique offer, phoned for additional information. The ad produced 11 service jobs and the shop "still gets returns from it." Many TV owners clipped and kept the ad which Stateside servicemen still find in households; some pasted it into telephone directories, others filed it away. Unlike most institutional copy, it produced sustained impact.

SYLVANIA ELECTRIC PRODUCTS INC.
 P. O. BOX 431
 EMPORIUM, PENNSYLVANIA

Sec. 34.66 P. L. & R.
 U. S. POSTAGE
 PAID
 Permit No. 1
 Emporium, Pa.

For

J. A. Renville
 163 Main St.
 Luzerne, Pa.

A

Form 3547 Requested

Vol. 19, No. 2

FEBRUARY 1952

PUBLISHED BY

SYLVANIA ELECTRIC PRODUCTS INC.

MANUFACTURERS OF SYLVANIA RADIO TUBES, CATHODE RAY TUBES, ELECTRONIC DEVICES, FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, ELECTRIC LIGHT BULBS, PHOTOLAMPS, RADIO AND TELEVISION RECEIVERS.



**PERSONAL NEATNESS
 IS GOOD ADVERTISING;**

**WEAR A
 SYLVANIA
 SERVICE
 COAT OR
 JACKET**



What will the well dressed serviceman wear? A Sylvania service coat or jacket, of course.

No fooling, you'll stay neat and clean all day with these service garments. Together with a white shirt and a tie, you are bound to impress your customers with your tidiness and give the impression that your work is neat and efficient.

Sylvania service garments are well tailored and made from rugged, hard-wearing fabrics. Big pockets at arms length in the service coat are good storage places for all types of odds and ends which belong only in pockets. Special buttoning on the service coat allows kneeling on floors without danger of spotting trousers.

The service jacket is made of the same rugged fabric as the shop coat. It is a single-breasted, three-button jacket which resembles a suit coat. Its neat appearance makes it extremely useful for service calls in homes and offices. It is preferred for shop use by many successful servicemen who know the value of personal neatness when attending customers.

Sylvania service garments are available in an attractive grey-green color. All of your personnel will want Sylvania service garments for protection of clothes and for appearance.

The coats and jackets are available in five popular sizes, 36, 38, 40, 42, and 44. Price of the knee length service coat is \$4.00 and the jacket is \$3.10.

Order Sylvania service garments for yourself and your employees. Your Sylvania Distributor has a stock, or they may be ordered from the Advertising Department, Sylvania Electric Products Inc., Emporium, Pa. When ordering from Emporium, please enclose your check, cash or money order. The garments will be shipped to you postpaid.

In This Issue

NEWS

SYLVANIA DISTRIBUTORS WILL BUY YOUR USED PICTURE TUBES

MERCHANDISING

USE SYLVANIA'S SPRING ADVERTISING CAMPAIGN KIT

TECHNICAL

TV SERVICING WITH AN OSCILLOSCOPE—PART 2

SYLVANIA NEWS

MARCH 1952

BEAT
THE
CLOCK



C. J. Lutten, editor
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Sylvania Electric Products Inc.

Vol. 19, No. 3



SYLVANIA OFFICIAL PREDICTS A GOOD YEAR FOR THE TELEVISION INDUSTRY

Frank W. Mansfield, director of sales research, says that the industry will progress at high levels of production and sales, barring economic upsets such as a major war or excessive materials restrictions.

There is no reason why the television industry can not sell about 4,500,000 sets to the public in 1952, if there are no major economic upsets, according to Frank W. Mansfield, director of sales research for Sylvania Electric Products Inc., who reported that the trend now points to a larger and larger percentage of sales for replacement and a smaller and smaller percentage for initial installation.

A bright forecast, certainly, for able, aggressive television service dealers.

During his discussion of market potentials at Sylvania's National Distributor Sales Department Conference, Mansfield explained that, "the change in the trend of television sales is due to the fact that the television market

is rapidly approaching saturation. At the end of 1950, it was approximately 38% saturated on a national basis, although 35% of the population was located where television progress was slow. At the end of 1951 practically 40% of the country had attained an average saturation of 70%."

Mansfield also reported that the demand for television sets by the public during 1951 had been consistently good, ranging from an annual rate corrected for seasonal trends, of 5,100,000 during the first quarter to 5,290,000 toward the end of the year.

"If the television station freeze is lifted, as is expected during 1952," Mansfield continued, "good television signals, now within reach of about 65% of the population, will ultimately

be extended to approximately 90% of the population.

Commenting on the concern, in some quarters, over television's rapid approach to a saturated market condition, Mansfield said that the assumption had been made that a saturated market is an exhausted market, and that nothing is farther from the truth.

"Market saturation will merely mean," Mansfield continued, "that the number of sets sold for replacement will increase and initial installations will decrease. We have estimated that there is a long term potential for initial and replacement sales ranging from 4,500,000 to 6,500,000 sets per year for many years to come."

APPRECIATIVE SERVICE DEALERS CHEER SYLVANIA'S REPLY TO LOOK MAGAZINE

Letters applauding Sylvania's support of the service industry in its reply to Philip Wylie's article in *Look* magazine continue to pour in. Service dealers throughout the country want Sylvania to know that they appreciate the constant help that the company gives their profession.

Here are a few of their comments: "Sylvania will go down in the history of radio-TV as one company who stepped out and took the lead to correctly inform the public of

the true position and practices of the average serviceman."—Elmer H. Wetenkamp, Rochester Radio Servicemen's Assn., Rochester, Minn.

"Congratulations on your forthright and courageous stand with respect to recent magazine articles which have condemned television repair men by accusation of unscrupulous practices."—Matthew Mandl, Trenton, N.J.

"Your attitude and actions greatly appreciated."—Howard L. Langston,

Eugene, Ore.

"It is good to know that there is someone willing to take up the cause of the unorganized servicemen."—W. S. Arns, Kenmore, N.Y.

"Thanks for coming to our defense."—Edgar C. Beckham, Beckham's Radio Shop, Waxahachie, Tex.

"It is indeed gratifying to read your article in the January 1st *Look* in defense of the TV serviceman. It is to my knowledge the first anyone

(Continued on page 3)

Service Dealers See Quality Built Into Sylvania Television Picture Tubes

Three groups of service dealers from Jackson, Detroit, and Kalamazoo, Michigan recently found out how Sylvania builds quality television picture tubes. As guests of Fulton Radio Supply Co., Radio Specialties Co., and Stevens Radio Parts, these dealers made one-day excursions to Sylvania's huge picture tube plant in Ottawa, Ohio.

They saw Sylvania's skilled workmen in a modern factory equipped with the latest mass production equipment. The trip demonstrated to these dealers more than once why Sylvania Picture Tubes always give a better performance.

Hosts at the factory were Plant Manager Bill Toner and Bruce McEvoy, Sylvania Division Manager.

Michigan service dealers in the above pictures recently got an inside story of how Sylvania makes superior picture tubes. From top to bottom: service dealers who were guests of Fulton Radio Supply Co. of Jackson; those taken by Radio Specialties Co., Detroit; and those who were guests of Stevens Radio Parts, Kalamazoo. These pictures were taken in front of the main entrance of the Ottawa Factory.



APPRECIATIVE DEALERS

(Cont. from page 2)

in a strong position has taken the trouble to answer such articles as Philip Wylie's."—Stuart H. Otis, Du-Rite Services, Chicago, Ill.

"Congratulations on your policy of going to bat for the radio-television serviceman."—Charles LeDuc, LeDuc Radio, Detroit, Mich.

"Having just read the reprint copy that you wrote in defense of the TV service man I want to thank you for the interest and effort to send so splendid a letter that explained our

end so beautifully."—E. C. Settle, Settle Television & Radio Co., Philadelphia, Pa.

"We greatly commend Sylvania for its successful research in defense of the standards of television service."

—D. T. Oliva, Queens Abington Corp., Forest Hills, N.Y.

"Congratulations for the splendid move that you made in behalf of the television servicing companies."

—Murray Pell, Southern Television Corp., Norfolk, Va.

"Thank you for your wonderful effort in clearing up the slander against servicemen."—Harry Miklasz,

Enterprise Radio & Television, Chicago, Ill.

"It was a noble deed on your part."—Harvey Faw, Faw Radio Service, Winston-Salem, N.C.

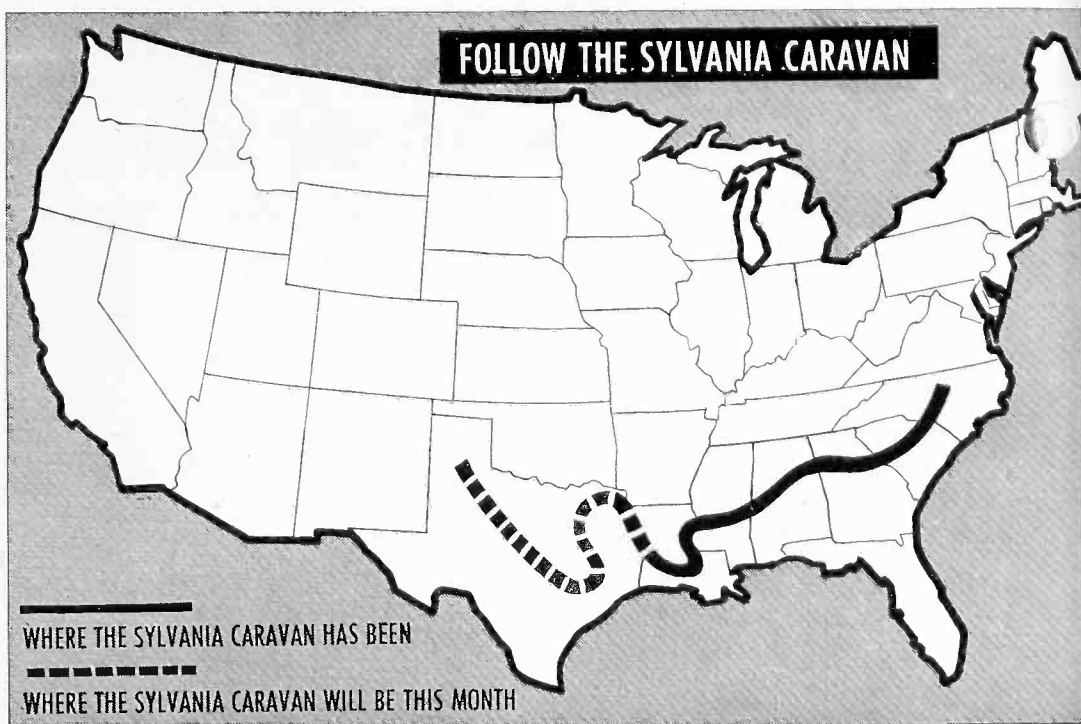
"Through surveys such as you have conducted we feel sure that you are helping to eliminate the doubt in the minds of some customers as to the honesty and ability of the servicemen and thereby give the majority who are trying to give the best service possible an honest break."—Charles F. Pankow, Pankow Radio & TV Service, New Hyde Park, N.Y.

Sylvania Service Meetings Coming Your Way

Watch for the Sylvania Caravan! It is a new and better series that will bring to radio and TV service dealers helpful lectures and demonstrations on servicing and on the use of test equipment. These meetings, sponsored by your Sylvania Distributor, are one of the ways in which Sylvania continues to support the independent service dealer.

The Sylvania Caravan consists of a Plymouth station wagon loaded with the special Sylvania TV set, which many service dealers throughout the country saw at Sylvania Service Meetings during 1951 (last year this set was shipped over 25,000 miles), a complete line of test equipment and other accessories. Bill Anderson and Allen White, Sylvania field engineers, will give servicing lectures, demonstrate profitable use of test equipment, and make personal calls on service dealers.

The Sylvania caravan started at



Norfolk, Virginia on February 11. Just read the remainder of this year-long schedule:

Feb. 11-29: Virginia to Louisiana; Mar. 10-21: Texas; Mar. 31—Apr. 18: Arizona to Washington; Apr. 21—May 9: Portland, Ore. to Billings, Mont.; May 26—June 6: Wyoming to Missouri; June 16-27: Minnesota

to Illinois; Sept. 1-12: Illinois to Kentucky; Sept. 15-26: Kentucky to Michigan; Oct. 6-10: New York; Oct. 13-17: Massachusetts and Connecticut; Oct. 20-24: New York City Area; Oct. 27-31: New Jersey and Pennsylvania area; Nov. 3-21: Pennsylvania and Maryland area.

Since this schedule is subject to change, watch your SYLVANIA NEWS for confirmation of dates. Keep in contact with your Sylvania Distributor for information as to when and where service meetings will take place. You won't want to miss the one in your area.

NEW SYLVANIA WAREHOUSE IN DALLAS



Sylvania's new warehouse in Dallas, Texas is another concrete example of the company's desire to give radio and television service dealers maximum service.

This new 20,000 square foot warehouse, according to Service Manager D. L. Flook, is now stocked with a quarter million radio tubes, 500 picture tubes, a full range of test equipment, electronic devices, not

to mention 25 carloads of lighting and photoflash products.

The warehouse is constructed so that three cars can be unloaded at the same time. There are two truck wells that will accommodate two trailers. With these ample facilities and personnel, Sylvania is now equipped to ship its Southwestern distributors orders within 24 hours after receipt.

1951 Industry Figures

Preliminary industry figures for the month of December indicate the production of 453,098 television sets and 844,424 radio sets, according to the Radio-Television Manufacturers' Association.

With these figures, the unofficial industry totals for the full year of 1951 are 5,251,154 television receivers and 12,545,539 radios. These compare with 7,400,000 television sets and 14,600,000 radios produced in 1950.

December production of radios included 555,133 home sets, 75,799 portables, and 213,492 auto sets.

LONG DISTANCE FM RECEPTION

By W. P. Mueller, Advanced Application Engineer

The allocation of the fm band in the 100 mc region confines fm reception essentially to line of sight coverage. However, since a sensitive fm receiver is capable of completely noise-free reception of extremely weak signals, surprising distances are covered regularly in good locations with an adequate fm receiver. Signals of five to ten microvolts are capable of providing 30 db quieting on the best receivers, and, if the man-made noise level at the receiving location is not several times this value, very good noise-free reception is possible on fm with such minute signals. There are still areas in the country in which the standard band broadcast reception during the summer months leaves much to be desired. In such areas, of which Emporium is one, it is profitable to exploit the possibilities of fm reception. Emporium lies in a valley at an elevation of 1000 feet above sea level and is surrounded on all sides by steep hills which rise 700 to 1200 feet higher. The two nearest fm transmitters are about 40 miles from Emporium. Adequate signals are received from one or both of these on the floor of the valley, but not without some expenditure of effort in some of the locations. Since some programs, like those of the Rural Radio Network, are available only on fm, expenditure of effort to obtain fm reception is often well worthwhile.

F M RECEPTION IN A GOOD LOCATION

The terrain about Emporium provides ample opportunity to study the effect of height on reception. On the top of one of the surrounding hills at an elevation of 2150 feet, the fm reception is truly utopian compared with that in the valley below. At this point, 1150 feet above and $1\frac{3}{4}$

miles south of the town, the signal strength, in microvolts, of the two nearest stations is some 30 db, or 33 times, stronger than it is on the floor of the valley. There are also many more stations available. On a representative day a total of some 33 fm stations were tuned in. The quality of reception was classified as follows: 8 were excellent, 15 were good, and 10 were weak. This reception was obtained on one of the better table model fm receivers with an antenna consisting of crossed folded dipoles about fifteen feet off the ground. Such an antenna receives equally well from all directions but has a loss of 3 db, when compared with a single dipole.

A log of a few of the stations received and definitely identified, is

shown in Table I. Twenty-three stations are listed, some as far as 200 miles distant. This is merely representative reception. No attempt was made to obtain a complete log of all the stations received over an extended period of time. Incidentally, identifying fm stations is sometimes a time-consuming process, since "station breaks" are generally made only twice per hour.

Few of us are fortunate enough to live on the top of a mountain. Therefore, let us now consider fm reception in a valley and how we may improve it.

F M RECEPTION IN A POOR LOCATION AND HOW TO IMPROVE IT

In mountainous terrain, fm re-

(Continued on page 8)

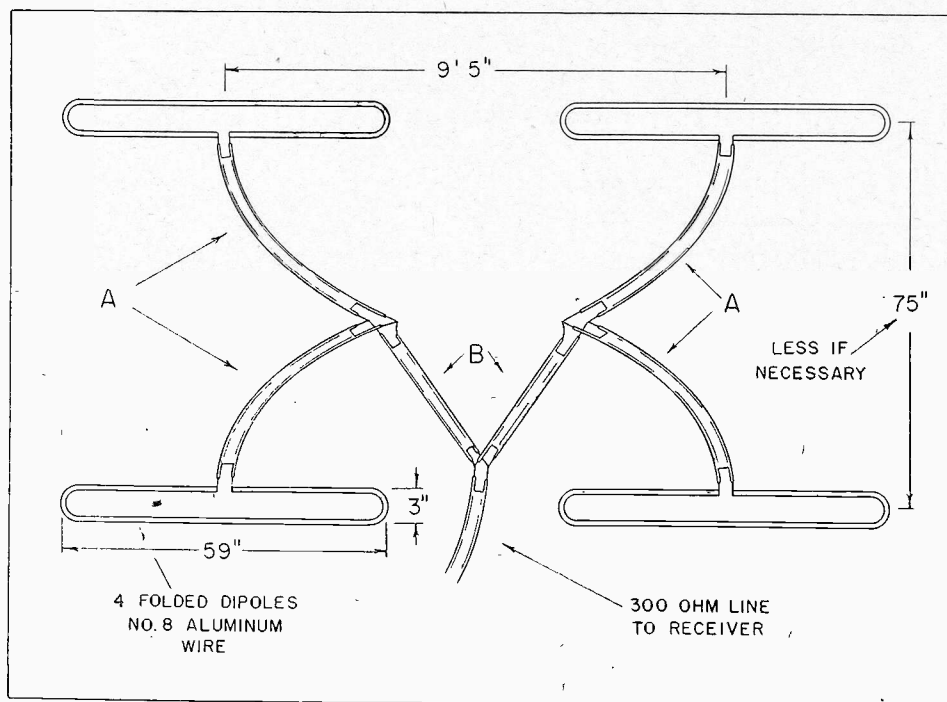


Figure 1. Four Dipole Receiving Array. Elevation View. Orient broadside to the direction of the desired signals. LEGEND: All connections made with 300 ohm twin lead. Leads "A"—Four equal length leads, any convenient length. Leads "B"—Two quarter-wavelength impedance matching sections, 26" long. Phase connections as shown. (Rightside of all dipoles connected together.)

AN ANTENNA FOR UHF TV RECEPTION

By J. S. Allen*, *Advanced Application Engineer*

The performance of a television receiver depends to a great extent on the antenna installation. This is particularly true at u h f where the increase in transmission line and propagation losses is such that, except in local areas, some sort of high gain antenna is mandatory for satisfactory reception. Fortunately, because of the high frequency involved, high gain antennae may be produced which are not physically clumsy.

THE ANTENNA—The antenna to be described here consists of four folded dipoles with reflectors, stacked vertically. The construction is not difficult and excellent results are obtained. A drawing of the antenna is shown in Figure 1, together with the design formulae for the various spacings. Models have been built using both copper and aluminum tubing. Copper offers some advantages because it may be joined with solder; however, it is considerably

heavier. Various types of aluminum solder are available but they are not recommended because of their low resistance to atmospheric corrosion and because they are somewhat difficult to use. The use of bolts or rivets is preferable in aluminum fabrication for outdoor installations.

PERFORMANCE—The forward gain of an antenna of this type, designed for a frequency of 525 mc, was measured at 11.7 db with respect to a single folded dipole. Horizontal and vertical radiation patterns are given in Figures 2 and 2A. Although the antenna is cut for a particular channel, satisfactory results may be expected over a range of several channels either side of the design frequency.

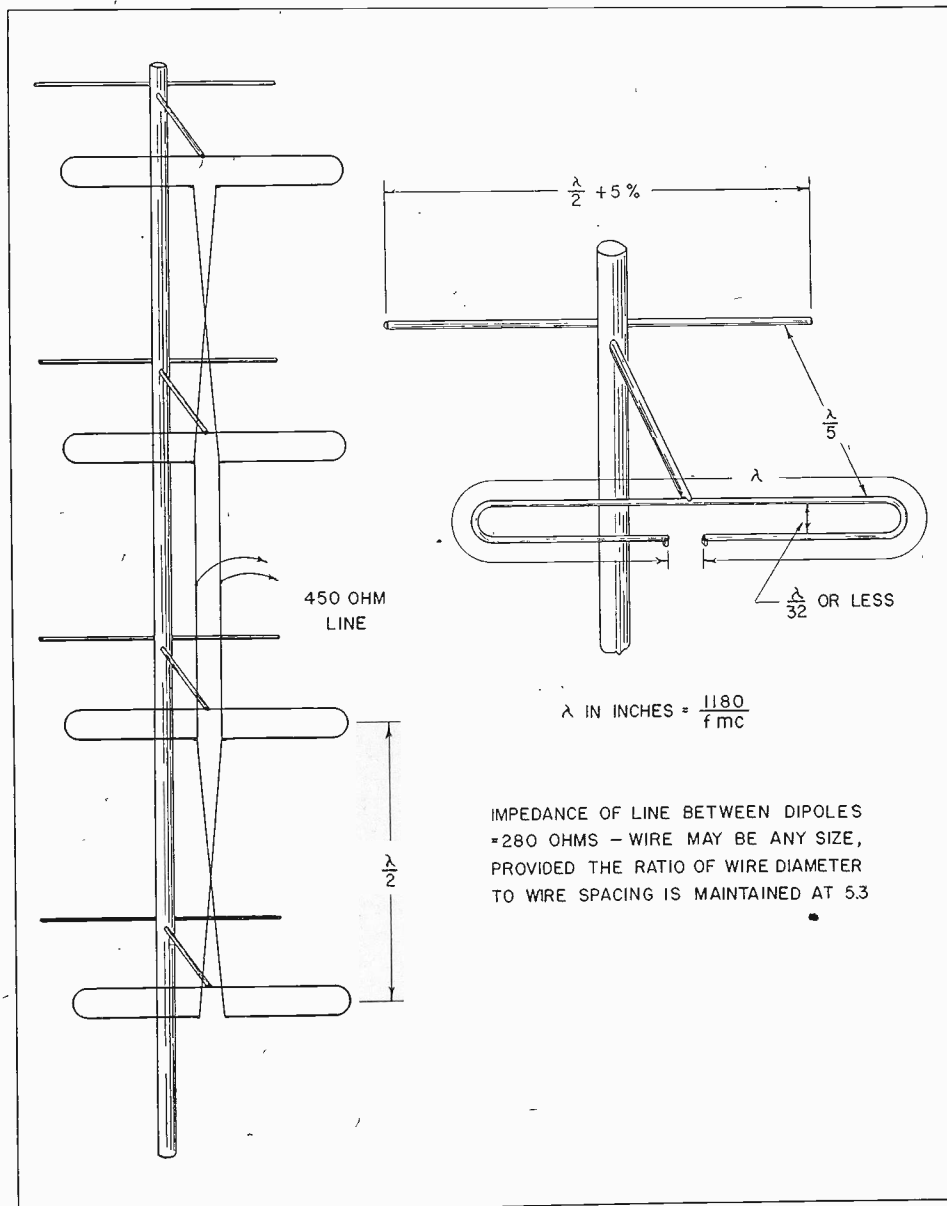
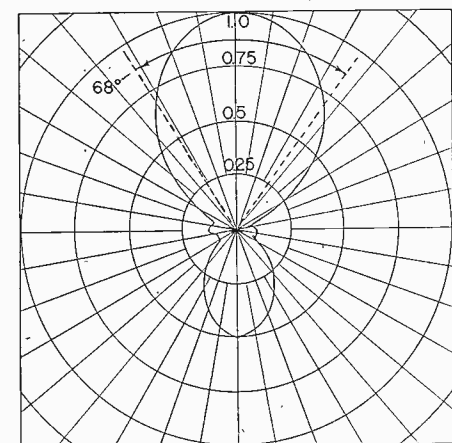
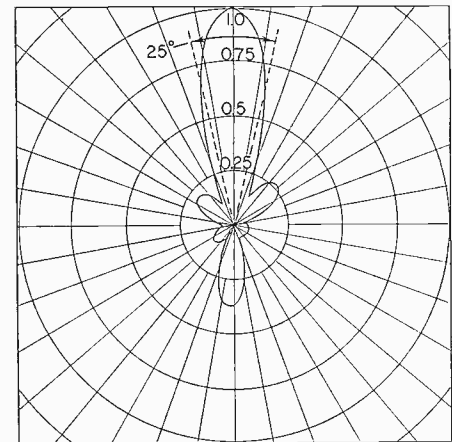


Figure 1. Antenna, showing design formulae for various spacings.



Figures 2 and 2A. Horizontal and Vertical Radiation Patterns.

THE TRANSMISSION LINE—The antenna is designed to feed commercially available 450 ohm open wire transmission line. This choice was made because of the considerably higher attenuation of coaxial cable and 300 ohm twin lead lines. Table I gives typical values of the db loss per 100 feet for the various types of line. Obviously, one should employ a transmission line with the lowest possible attenuation. Otherwise, it would be quite possible to incur such a loss in the transmission line that the gain of the antenna would be completely nullified. Such a condition will result from the use of 360 feet of dry or 59 feet of wet 300 ohm twin lead line; 390 feet of dry or 115 feet of wet tubular 300 ohm line; 120 feet of RG-59U; 230 feet of

RG-11U, or 1400 feet of 450 ohm open wire line, with the 525 mc antenna described.

At the receiver end of the line, one of two things must be done, depending on whether the receiver is designed to match 300 ohm line or 50 or 75 ohm coaxial cable. In the first case, the line may be matched to the receiver with a section of line $\frac{1}{4}$ wave length long at the antenna design frequency and having a characteristic impedance of 368 ohms. Alternately, a tapered line may be used. This consists of a section of transmission line that has an impedance of 300 ohms at the receiver and changes gradually to 450 ohms over a distance of at least 2 wavelengths.

If the receiver is designed for a

TABLE I
TRANSMISSION LINE LOSS
DB LOSS PER 100 FEET

| TYPE | 100 MC | | 500 MC | | 1000 MC | |
|---------------------|--------|------|--------|-----|---------|------|
| | WET | DRY | WET | DRY | WET | DRY |
| 450 ohm open wire * | ... | 0.35 | | .78 | | 1.1 |
| 300 ohm tubular | 2.5 | 1.1 | 6.8 | 3.0 | 10.0 | 4.6 |
| 300 ohm flat | 7.3 | 1.2 | 20.0 | 3.2 | 30.0 | 5.0 |
| RG-59U | ... | 3.8 | | 9.4 | | 14.2 |
| RG-11U | ... | 1.8 | | 5.0 | | 7.6 |

*Estimated values—unknown for wet conditions.

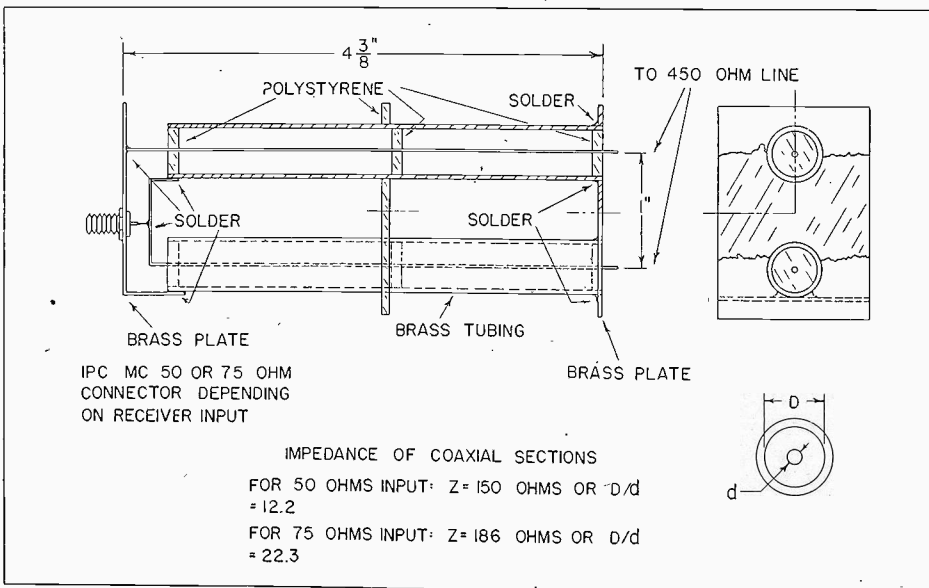


Figure 3. Balun for matching impedance.

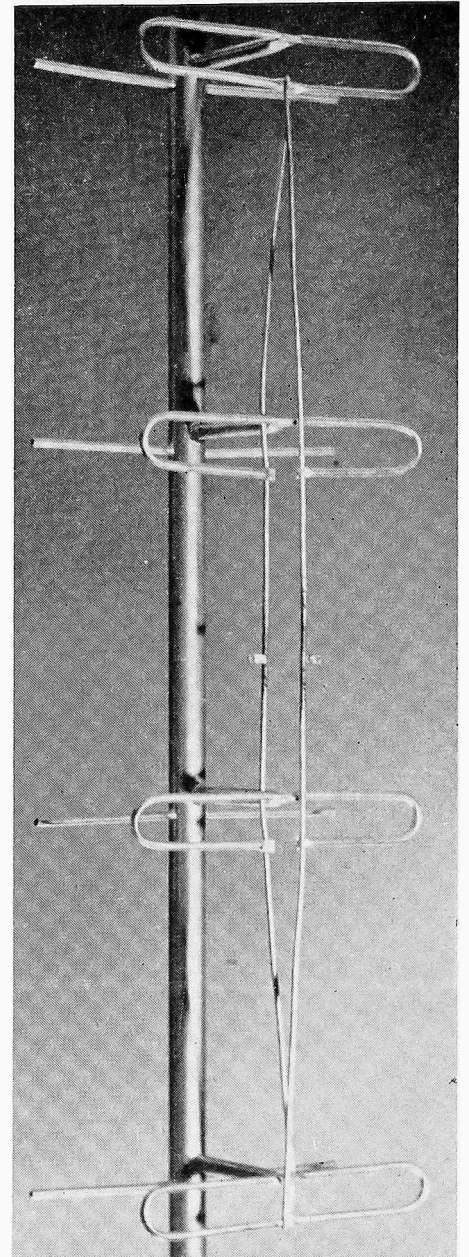


Figure 4. Photograph of UHF TV Antenna.

coaxial line input, a balun, or balanced-to-unbalanced transformer must be used. A drawing of a balun is shown in Figure 3 and data is given for matching 50 or 75 ohm coaxial line to 450 ohm open wire line.

This antenna is but one of several types suitable for use at u h f. However, the construction is not difficult, the measured performance has shown excellent agreement with the theoretical value, and the gain is adequate for all but the most difficult locations.

*James S. Allen is a member of the Advanced Applications Section of Sylvania's Commercial Engineering Department at Emporium, Pennsylvania.

LONG DISTANCE FM RECEPTION

(Continued from page 5)

ception in a valley may be poor simply due to lack of adequate signal strength. Occasionally, trouble is also encountered from multipath reception, which may be recognized by high distortion of the audio at certain levels of modulation, although the average signal level appears quite adequate. One explanation for this effect is that the signal is being received over two or more paths; and at certain frequencies corresponding to particular modulation levels, the signals arrive with such phase relationship as to cancel each other. This may be overcome by either of

two opposite modes of attack on the problem.

The first method is the obvious one of increasing the directivity of the antenna by adding reflectors or directors and orienting the antenna to receive the signal from but one source. The disadvantage of this procedure is that it is usually necessary to add a rotator to the antenna, if one wishes to receive more than one station, since it is infrequent that one direction will suffice for all the available stations even though one makes use of "bounces" from a hill rather than pointing the antenna directly toward the station. In heavily wooded country the reflection conditions change markedly with the seasons, or with the presence or absence of leaves on the trees.

An alternate method of overcoming multipath reception is to interconnect several dipoles whose physical dispersion is such as to prevent complete cancellation of signals in all the dipoles at any one time. This method is particularly effective where the stations lie in opposite directions. A method of connecting four folded dipoles together is shown in Figure 1. This array is matched to a 300 ohm line

by means of sections of 300 ohm twin lead of the proper length. It may be inexpensively constructed from aluminum clothesline wire and mounted in the attic of the house, out of the way and out of sight. It is bi-directional and has a theoretical gain of 6 to 7.9 db.

If the signals available are not strong enough to provide limiting in the fm receiver, it is often possible to increase the sensitivity of the receiver by the addition of a good wide band untuned booster in front of the receiver. Such a booster will be described in a forthcoming issue of SYLVANIA NEWS.

William P. Mueller received his BS in electrical engineering from Ohio State University in 1932. He joined Sylvania in 1933, starting in the Engineering Test Department at Emporium. In 1934, he worked in the Transmitting Tube Department at Clifton, New Jersey. He returned to Emporium the following year to specialize in tube application problems at vhf, as a member of the Tube Application Department. Mr. Mueller served as Supervisor of Engineering at the Industrial Apparatus plant at Williamsport from 1944 to 1946. Since that time he has devoted his time to tube application problems in the fm and tv services as a member of the Advanced Application Section of the Commercial Engineering Department at Emporium.

His last paper, "Signal Generator Connections in Television Alignment" appeared in the February, 1951, NEWS.

TABLE I

Representative Log of FM Stations Received at a Good Location, 1¼ Miles from Emporium, Pennsylvania at an Elevation of 2150 Feet.

| Station | Frequency MC | Power KW | Distance Miles |
|---------|--------------|----------|----------------|
| WFNF | 107.7 | 1.3 | 80 |
| WCLI-FM | 106.1 | 4.2 | 75 |
| WWHG-FM | 105.3 | 8.3 | 70 |
| WLYC | 105.1 | 3.2 | 65 |
| WJEJ-FM | 104.7 | 1.5 | 130 |
| WJW-FM | 104.1 | 19.0 | 180 |
| WICA-FM | 103.7 | 52.0 | 135 |
| WPIC-FM | 102.9 | 26.0 | 120 |
| WCED-FM | 102.1 | 9.5 | 38 |
| WRAK-FM | 100.3 | 3.2 | 65 |
| WJAS-FM | 99.7 | 24.0 | 115 |
| WNAV-FM | 99.1 | 17.0 | 195 |
| WAZL-FM | 97.9 | 76.0 | 125 |
| WTOA | 97.5 | 14.0 | 200 |
| WHCU-FM | 97.3 | 40.0 | 110 |
| WTOP-FM | 96.3 | 20.0 | 190 |
| WHDL-FM | 95.7 | 40.0 | 42 |
| WJAC-FM | 95.5 | 8.3 | 85 |
| WKOK | 94.1 | 4.4 | 87 |
| WKJF | 93.7 | 20.0 | 115 |
| WJTN-FM | 93.3 | 9.5 | 66 |
| WBNY-FM | 93.0 | 48.0 | 105 |
| WRFL | 92.5 | 13.0 | 160 |

Service Hints

CRACKED PLASTIC CABINETS
on radio or television receivers may be easily and neatly repaired by following the steps listed. First, apply carbon tetrachloride along the crack on the *inside* of the cabinet, to remove any grease or other substance. Second, apply radio cement the full length of the crack and about ½ inch on either side of the crack. Third, place one-inch gauze bandage over the crack, press smoothly and apply a little more cement on top of the bandage. While drying, a weight should be applied to keep the crack closed tightly. This will do a neat, clean and permanent job, since the dried cement will never be affected by heat.—J. P. Torre, Brooklyn, N. Y.

LATE MODEL FORD ZENITH
radios which emit a loud clicking noise while auto is in motion, although reception is clear while motor is idling, may be improved by removing (or replacing) suppressor used on the coil. The suppressor lead must be close to one of the spark plug wires, and in some way picks up noise from that plug.—J. Griffith, Delphia, Kentucky.

Editor's note: While this may work adequately in some cases, it is advised that the method be tried before discarding the suppressor; also, some noise (though possibly not as obvious) may result from the removal of the suppressor.

MERCHANDISING SECTION

MARCH 1952

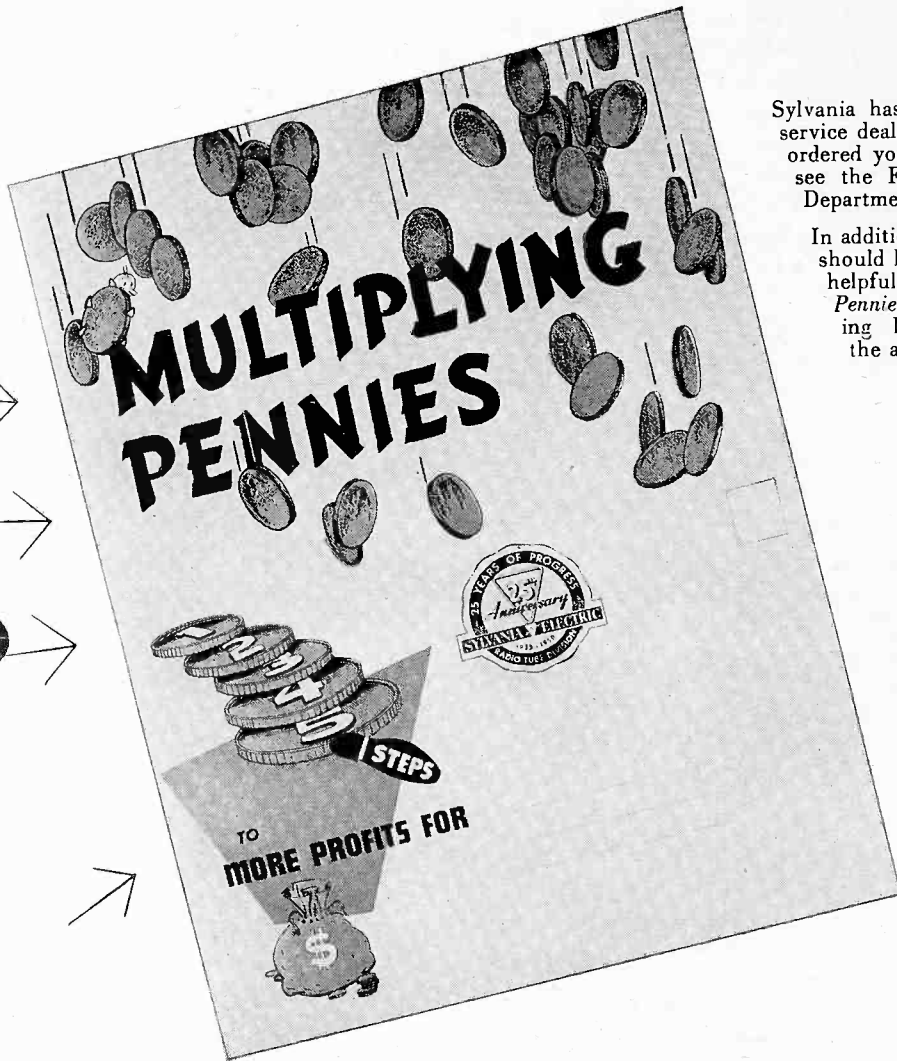
Vol. 19, No. 3

ALERT ADVERTISING

IS GOOD BUSINESS IN LUSH OR LEAN TIMES

Sylvania has a variety of mailing pieces that are designed to help service dealers do inexpensive yet profitable advertising. (Have you ordered your Sylvania Local Advertising Kit yet? For full details, see the February SYLVANIA NEWS or write the Advertising Department, Emporium, Pa.)

In addition, Sylvania offers scores of other advertising aids which should be of interest to all alert service businesses. All of this helpful material is discussed in Sylvania's folder *Multiplying Pennies*. Why don't you order yours today from the Advertising Department, Emporium, Pennsylvania. It is free for the asking.



is also usually a cartoon or a photo used to catch the reader's eye and to support a particularly important news story. Somewhere in the piece there is, of course, a selling squib that is designed to impress the reader with what MacFarland does and how well he can do it.

One of the mailings, for example, was issued just at the time the color TV controversy had everyone confused. It outlined in the simplest language all of the true and vital facts about color television. It told the reader that if he wanted to get color Nassau was prepared to do the necessary conversion work and supply the adaptor. And if something better in color TV came along, it stated that Nassau would again be ready to meet the situation. You may be sure that these facts were appreciated.

Having a good mailing list and *The Tele-News Letter*, which kept his name before his prospects, MacFarland was able to do things when things got tough.

Last summer during a particularly poor month *The Tele-News Letter* was addressed to the lady of the house. It described how she might be able to buy some extra groceries for the house on the money saved by taking advantage of the opportunity being

(Continued on page 12)

When business fell off this past summer, it must have reminded many service dealers that there are rough periods even in the middle of an expanding market. It also must have made many stop and ponder that in the future there would be a few bad months.

What to do? Many a successful service dealer would say—constant advertising in both the lush and lean times together with a few ingenious ideas.

By the way of illustrating the

above advice, here is what one Long Island, N.Y. television service dealer did the last time the weather was hot and business was poor. Harold F. MacFarland of Nassau Television & Electronic Lab., first of all, always relies upon a monthly, direct-to-the-customer-and-prospects promotional piece that is timely and inexpensive. This mailing piece—*The Tele-News Letter*—is a mimeographed single or double sheet with some intelligently selected items that aim to interest every television set owner. There

BEAT THE CLOCK HELPS SELL YOUR SERVICE

Commercials on Sylvania's popular television show, *Beat the Clock* continually plug the service man who displays the Sylvania Radio-Television Service Emblem. They tell your prospects that the man behind that emblem offers dependable service, and quality materials at a fair price. Make sure that you can be identified as *that man*. Have the Sylvania Emblem on your windows, door, and truck. You can get as many as you want *free* from the Advertising Department, Emporium, Pa. or your Syl-

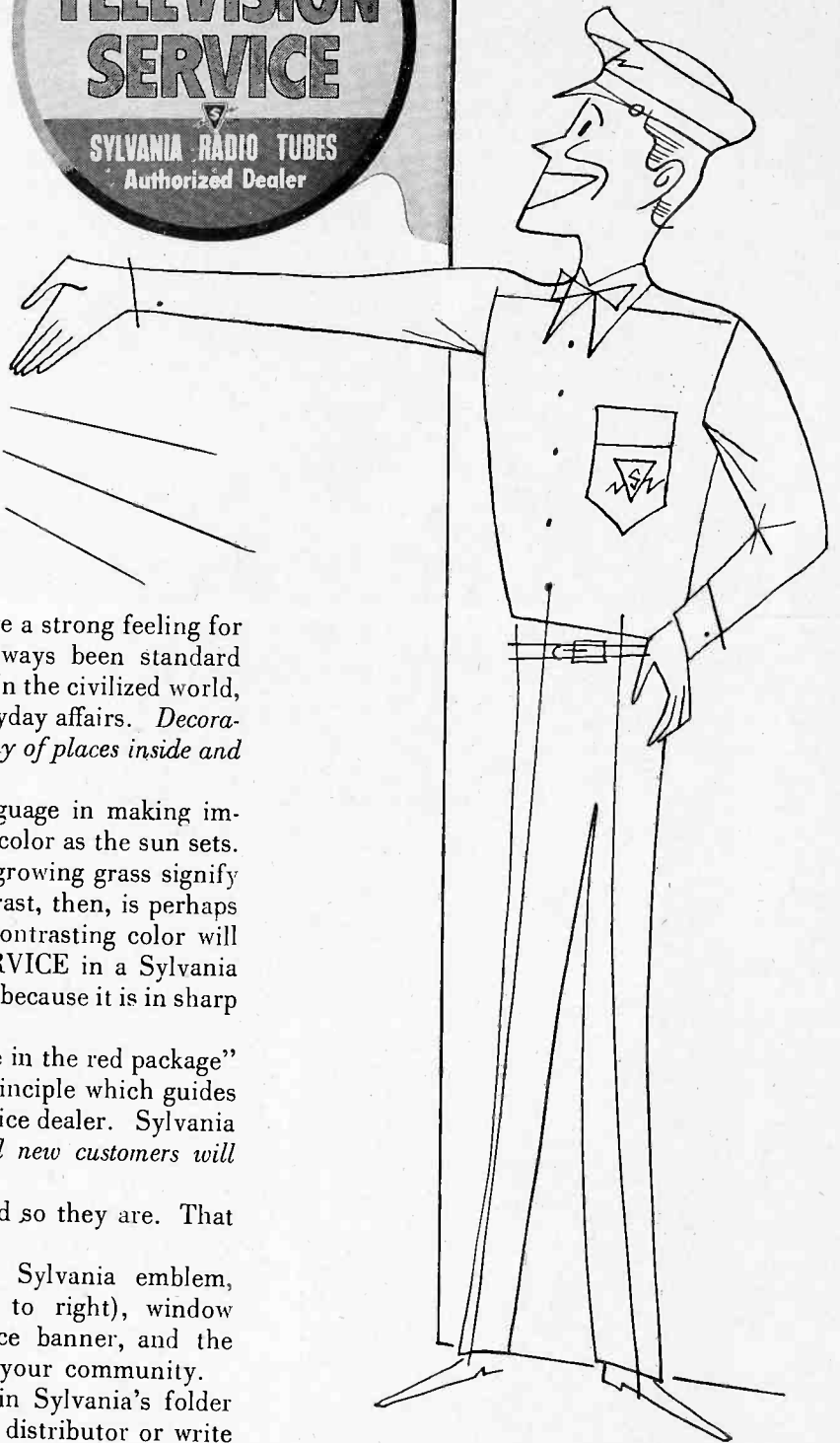
vania Distributor.

And while you are about that, ask for information about Sylvania's terrific local advertising campaign that ties you in with the company's national advertising of your service in *Life*, *Saturday Evening Post*, *Collier's*, and *Better Homes & Gardens*, if you have not already ordered yours.

Here's an up-to-the-minute list of television broadcast stations carrying *Beat the Clock*, with the dates when commercials promoting your service can be seen:

| CITY | STATION | LOCAL TIME and DAY | SERVICE DEALER COMMERCIALS |
|----------------|---------|-----------------------|----------------------------|
| Atlanta | WAGA-TV | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |
| Baltimore | WMAR-TV | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |
| Birmingham | WAFM-TV | 6:30- 7:00 PM Sat. | Mar. 1-Mar. 22 |
| Boston | WNAC-TV | 5:00- 5:30 PM Sat. | Mar. 15-Apr. 5 |
| Buffalo | WBEN-TV | 2:30- 3:00 PM Sat. | Mar. 8-Mar. 29 |
| Charlotte | WBTW | 5:00- 5:30 PM Sat. | Mar. 8-Mar. 29 |
| Chicago | WBKB | 6:30- 7:00 PM Sat. | Mar. 1-Mar. 22 |
| Cincinnati | WKRC-TV | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |
| Cleveland | WXEL | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |
| Columbus | WBNS-TV | 7:00- 7:30 PM Sat. | Mar. 6-Mar. 27 |
| Dallas | KRLD-TV | 9:30-10:00 PM Sat. | Mar. 13-Apr. 3 |
| Dayton | WHIO-TV | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |
| Detroit | WJKB-TV | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |
| Greensboro | WFMY-TV | 6:30- 7:00 PM Sat. | Mar. 8-Mar. 29 |
| Indianapolis | WFBM-TV | 10:30-11:00 PM Sat. | Mar. 8-Mar. 29 |
| Jacksonville | WMBR-TV | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |
| Kansas City | WDAF-TV | 11:00-11:30 PM Sat. | Mar. 15-Apr. 5 |
| Lancaster | WGAL-TV | 2:30- 3:00 PM Sun. | Mar. 9-Mar. 30 |
| Los Angeles | KTSL | 7:30- 8:00 PM Sat. | Mar. 15-Apr. 5 |
| Louisville | WHAS-TV | 10:00-10:30 PM Thurs. | Mar. 13-Apr. 3 |
| Minneapolis | WTCN-TV | 10:00-10:30 PM Sat. | Mar. 8-Mar. 29 |
| New Orleans | WDSU-TV | 3:00- 3:30 PM Sat. | Mar. 8-Mar. 29 |
| New York | WCBS-TV | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |
| Oklahoma City | WKY-TV | 11:00-11:30 PM Wed. | Mar. 12-Apr. 2 |
| Philadelphia | WCAU-TV | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |
| Phoenix | KPHO-TV | 8:30- 9:00 PM Sat. | Mar. 15-Apr. 5 |
| Rock Island | WHBF-TV | 9:00- 9:30 PM Sat. | Mar. 8-Mar. 29 |
| Salt Lake City | KSL-TV | 6:30- 7:00 PM Mon. | Mar. 13-Apr. 2 |
| San Diego | KFMB-TV | 10:30-11:00 PM Thurs. | Mar. 13-Apr. 3 |
| San Francisco | KPIX | 10:00-10:30 PM Sat. | Mar. 15-Apr. 5 |
| Seattle | KING-TV | 4:30- 5:00 PM Sat. | Mar. 15-Apr. 5 |
| St. Louis | KSD-TV | 11:00-11:30 PM Fri. | Mar. 7-Mar. 28 |
| Syracuse | WHEN | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |
| Washington | WTOP-TV | 7:30- 8:00 PM Sat. | Mar. 1-Mar. 22 |

COLOR MEANS MORE PROFITS FOR YOU; LET SYLVANIA HELP BRIGHTEN UP YOUR STORE



All human beings, irrespective of intelligence levels, have a strong feeling for color. Brightly colored novelties have, for example, always been standard equipment for explorers in uncivilized parts of our world. In the civilized world, society continually exhibits its preference for color in everyday affairs. *Decorative touches of color which relieve the black and white monotony of places inside and outside of your store will attract customers.*

Color attracts attention because it is nature's own language in making impressions on the eye. We stand and watch the sky change color as the sun sets. We feel refreshed when the green of budding leaves and growing grass signify the change from winter to spring. Color change and contrast, then, is perhaps the greatest eye-catcher of all. Printing surrounded by contrasting color will carry your message. The red RADIO TELEVISION SERVICE in a Sylvania emblem, for example, will impress your potential customers because it is in sharp contrast to the yellow and green which surrounds it.

How many times have you heard the expression "the one in the red package" or "the jar with the green and white label?" This is the principle which guides Sylvania in preparing merchandising aids for you—the service dealer. Sylvania has put color into these "helpers" so that *your old and new customers will remember who you are and what you do.*

These reasons for using color may seem elementary; and so they are. That is in fact a merit for their purpose.

Simple, colorful aids of identification such as the Sylvania emblem, electric clock, metal flange sign, (shown above from left to right), window transparency, fluorescent electric sign, weatherproof service banner, and the Sylvania thermometer advertise you in basic language to your community.

All of these handy helps and many others are described in Sylvania's folder *Multiplying Pennies*. Pick up a free copy at your Sylvania distributor or write the Advertising Department at Emporium, Pa. Take advantage of the low-cost items offered. The pennies spent for colorful advertising will earn big profits.

New Prices on Five Sales Helps

Prices on five of the sales promotion items listed in Sylvania's *Multiplying Pennies* folder (which may be obtained from your Sylvania Distributor) have been revised.

The shop coat and jacket (see the February SYLVANIA NEWS) are now \$4.50 and \$3.25 respectively. Sylvania Service Banners are 50 cents.

Other changes include the All-Metal File Box—now \$2.50—and the All-Metal Tool Kit—now \$3.00.

ALERT ADVERTISING

(Continued from page 9)

offered. It suggested that Nassau be allowed to examine the owner's TV set and that if replacement tubes were needed, same would be installed for no service fee and at 40% discount off regular list price. Required repairs would be estimated before

any job was started, with the following scale to be charged: 7-inch sets, \$2.50; 10-inch sets, \$3.50; 12" sets, \$4.50; 14" sets, \$5.50; 16-inch and 17-inch sets, \$6.50; 19-inch and 20-inch sets, \$7.50.

The deal worked like magic. Scores of jobs were obtained, and the great bulk of them were profitable because they comprised, in the main, a simple realignment or adjustment process.

One might think from some of the previous mentioned details that Nassau Television & Electronic Lab., is a large business with headquarters to match. On the contrary, it is of quite average size and is operated from MacFarland's home in Ocean-side. It should be an inspiring fact to many that a relatively small servicing organization through energy and ingenuity should have such constant success and such imposing operations.

Though once known as Mac's Radio (a familiar Long Island institution since its beginning in Corona, Queens, L. I., in 1933), MacFarland's operation today is almost exclusively devoted to TV set servicing. MacFarland employs two helpers who

operate two cars and do simple servicing or antenna installation. He does the remainder of the servicing either in his shop or in the customers' homes. Since his work is of the complex variety, he utilizes a suburban passenger car which converts into a truck. Mrs. MacFarland is in charge of the *Tele-News Letter*, mailing list and general correspondence.

The great majority of Nassau Television & Electronic Lab. customers are situated in the nearby Long Island cities of Freeport, Rockville Center, Baldwin, Malverne, and Lynbrook. Nassau's mailing list, which numbers approximately 5,000, started with MacFarland's simple but sound idea of counting antennas in the various towns and checking them off against local "yellow books" for names of potential customers.

That MacFarland is an enthusiastic user of Sylvania tubes is apparent when one enters his shop, a tidy backroom of his residence, the shelves are predominately "Sylvania green." He is also a staunch believer in up-to-date test equipment. Much of this equipment, which includes an oscilloscope, a mega-sweep, a signal generator and a voltmeter also bears the Sylvania imprint.

SYLVANIA NEWS

SYLVANIA ELECTRIC PRODUCTS INC.
P. O. BOX 431
EMPORIUM, PENNSYLVANIA

Sec. 34.66 P. L. & R.
U. S. POSTAGE
PAID
Permit No. 1
Emporium, Pa.

For

David E. Zarlin
1403 Downing St. N. E.
Washington 18, D. C.

Form 3547 Requested

Vol. 19, No. 3

MARCH 1952

PUBLISHED BY
SYLVANIA ELECTRIC PRODUCTS INC.

MANUFACTURERS OF SYLVANIA RADIO TUBES, CATHODE RAY TUBES, ELECTRONIC DEVICES, FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, ELECTRIC LIGHT BULBS, PHOTOLAMPS, RADIO AND TELEVISION RECEIVERS.

On the Cover

Bud Collyer (center) watches two contestants try to beat the Sylvania clock (top left). This popular TV show is helping to promote your service business (see page 10).

In This Issue

NEWS
SYLVANIA OFFICIAL
PREDICTS GOOD YEAR FOR
TV INDUSTRY

MERCHANDISING
ALERT ADVERTISING IS
GOOD BUSINESS

TECHNICAL
LONG DISTANCE FM
RECEPTION

SYLVANIA NEWS

APRIL 1952



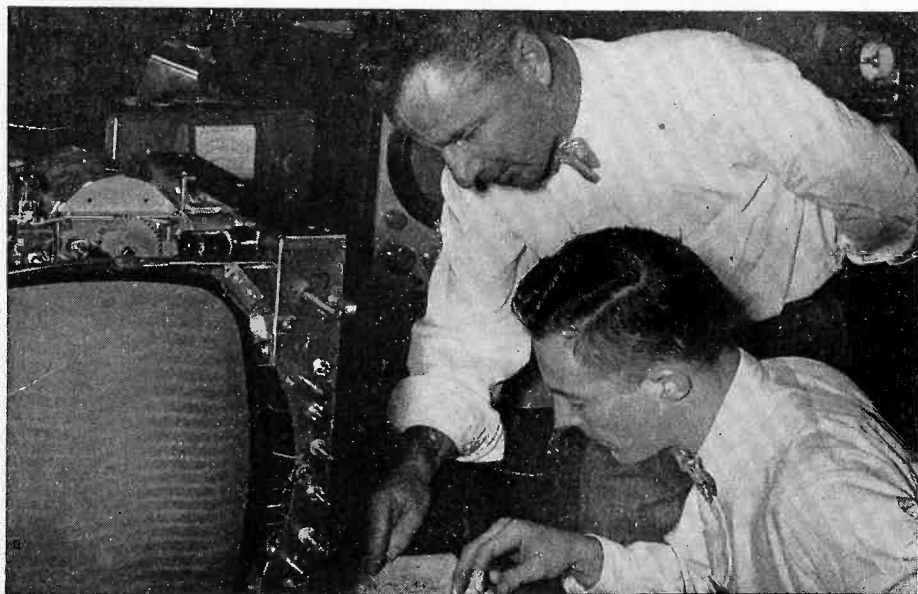
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Sylvania Electric Products Inc.
Vol. 19, No. 4

1952 SYLVANIA SERVICE SERIES

OPENS IN NORFOLK, GETS ENTHUSIASTIC RECEPTION



- The Sylvania Caravan consists of the Plymouth station wagon shown above loaded with the special Sylvania TV set, which many service dealers throughout the country saw at Sylvania Service meetings during 1951 (last year this set was shipped over 25,000 miles), and a complete line of test equipment and other accessories. Watch for the Sylvania Caravan in your area. Right now, its westward bound.
- Bill Anderson, Sylvania Field Engineer, and Dave Quinn, of Radio Supply Company service department (standing), re-check a schematic of a receiver that is giving some trouble.



The 1952 Sylvania Service Series, sponsored by local Sylvania distributors throughout the nation, got off to a flying start in Norfolk, Va. With the generous cooperation of the Radio Supply Co. of Norfolk, Bill Anderson, Sylvania Field Engineer, was able to again show "Sylvia" (Sylvania's lucite-encased TV set, with built-in malfunctions), indicate circuitry problems (and solutions), and explain test equipment and techniques in television servicing. Black and white and color slides were used to illustrate various topics during the meeting.

Servicemen and dealers from Norfolk and surrounding territory visited the Sylvania meetings during Bill's two-day stay in Norfolk. Throughout these meetings which were held nearby Norfolk's new and powerful television station (WTAR-TV), Bill picked up a very strong, clear signal—which was subsequently distorted on "Sylvia's screen" when various components were shorted out to show how different patterns may be caused. A Sylvania Type 400 Oscilloscope and Oscilloscope Calibrating Standard were set up, adjacent to the television receiver, to show how various wave shapes should and should *not* appear.

Technical literature and cards listing additional information (most of it free for the asking) were distributed to visiting service technicians. Some of the latest techniques that may be applied to service work, instruction in the use of test equipment and basic and advanced theory were described. Although the primary object of Sylvania Service Meetings is to disseminate servicing and test equipment information in general, Bill was asked and glad to answer specific questions on Sylvania equipment.

The Sylvania Service Series feature meetings which are concerned with television service in general. No



- Here at left are various pieces of Sylvania test equipment that Bill Anderson displays and explains during Sylvania Service Series meetings. Front row, left to right, are shown the Sylvania Type 132Z Oscilloscope, TV Marker Generator, Signal Generator, TV Sweep Signal Generator, Type 400 Oscilloscope. Back, left to right, are the Oscilloscope Calibrating Standard, Type 220 Tube Tester, and the 221Z Polymer.

- In photo below Bill Anderson tells A. A. Bradshaw (left), one of Norfolk's largest TV dealers, and Albert Williams, store manager of Radio Supply Co., how the various switches in "Sylvia's" chassis may simulate one or more typical TV ailments.

- M. W. Eledge, newcomer to the field of television servicing in Newport News, Va., gets a few pointers on the use of a Sylvania Type 400 Oscilloscope in TV trouble-shooting, from Bill Anderson (photo at bottom).

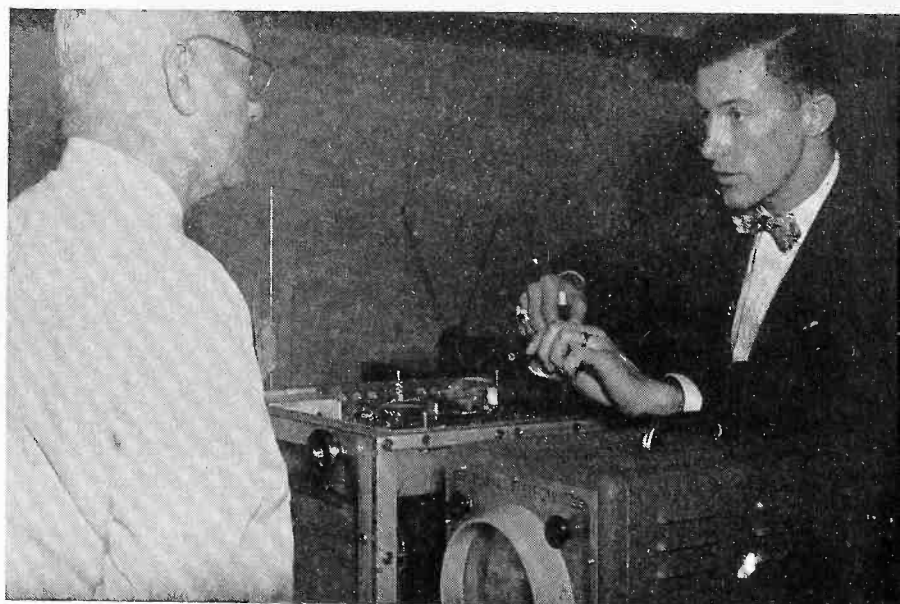
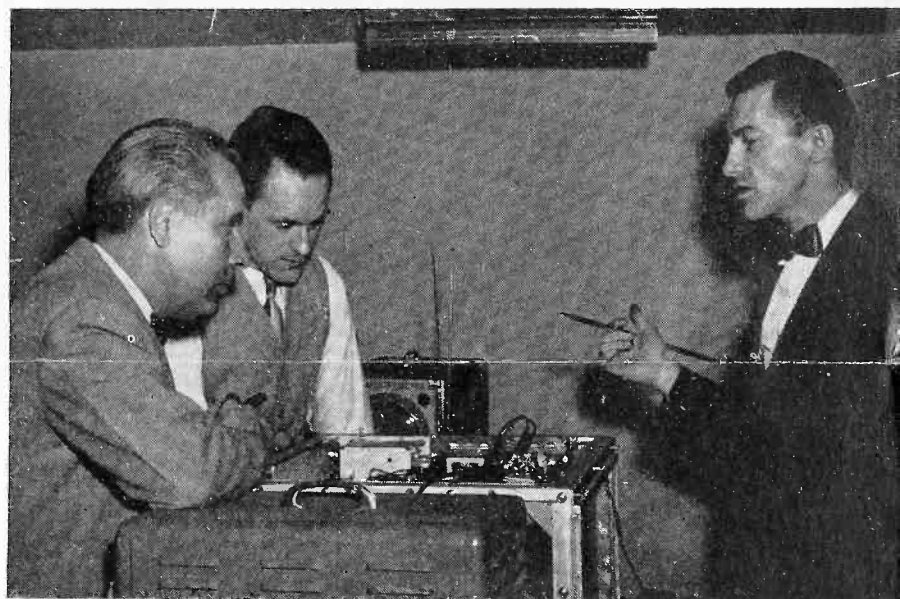
specific television set is discussed. The chosen topics are broad in scope and designed to give the service man maximum help in minimum time.

Bill Anderson, Al White, and other factory engineers, with "Sylvia" and a station wagon full of test equipment and technical literature will continue their tour through Georgia, Louisiana, Texas, California, and Washington this spring. In early summer the Sylvania Caravan will hold meetings throughout the Midwestern and Central States.

See your local Sylvania Distributor for information on the next Sylvania Service Series meeting in your area. It's only through the whole-hearted support of local distributors that Sylvania is able to offer you more and better packaged technical information. Keep in touch with your Sylvania Distributor, he's a good guy to know!

The Sylvania Caravan is tentatively scheduled to appear in the following areas during the remainder of this year.

Mar. 31-Apr. 18: Arizona to Washington; Apr. 21-May 9: Portland, Ore. to Billings, Mont.; May 26-June 6: Wyoming to Missouri; June 16-27: Minnesota to Illinois; Sept. 1-12: Illinois to Kentucky; Sept. 15-26: Kentucky to Michigan; Oct. 6-10: New York; Oct. 13-17: Massachusetts and Connecticut; Oct. 20-24: New York City Area; Oct. 27-31: New Jersey and Pennsylvania Area; Nov. 3-21: Pennsylvania and Maryland Area.



SYLVANIA EXHIBIT AT RADIO ENGINEERING SHOW FEATURED MANY RADIO, RADAR AND TV ADVANCES

Engineers shown testing of subminiature tubes, a review of germanium and silicon crystal development, and microwave tubes. Tungsten and chemical products for tubes and television picture tube screens also exhibited.



- Above photo shows the Sylvania exhibit at the 1952 I. R. E. show, recently held at New York City's Grand Central Palace.
- One of the crowds at the Sylvania exhibit that watched Agnes Meier, junior technician at Sylvania's plant in Kew Gardens, N. Y., demonstrate one of the many quality tests which all Sylvania Subminiature Tubes must pass.

The exhibit of Sylvania Electric Products Inc. at the Radio Engineering Show, sponsored by the Institute of Radio Engineers, in New York City's Grand Central Palace, featured many products included in recent important advances in the radio, radar and television arts.

Subminiature tubes, now important in a host of electronic devices for the national defense program, were vibration tested in the Sylvania Exhibit by operators loaned by one of Sylvania's subminiature tube plants. The attractive young ladies demonstrated subminiature tube vibration noise testing on specially designed equipment. The subminiature tubes tested are similar to "premium" types produced for unflinching dependability in vital defense services.

Other compact electronic devices on display included germanium and silicon crystals. These crystal diodes have found a wide range of application in home television sets, electronic computers, radar detection and many other advanced electronic applications. Crystal diode development has also greatly stimulated research toward multi-element crystal devices now in advanced stages of development.

The Sylvania radio-electronics exhibit also featured a group of specially designed triodes and klystrons that are finding many applications in the microwave field.

Sylvania's Tungsten and Chemical Division, exhibiting for the first time at this year's Radio Engineering Show, presented tungsten wire and rod products for electronic applications, phosphor and high purity chemical products important in the production of TV picture tubes and radar screens.

6U8 (cont'd)

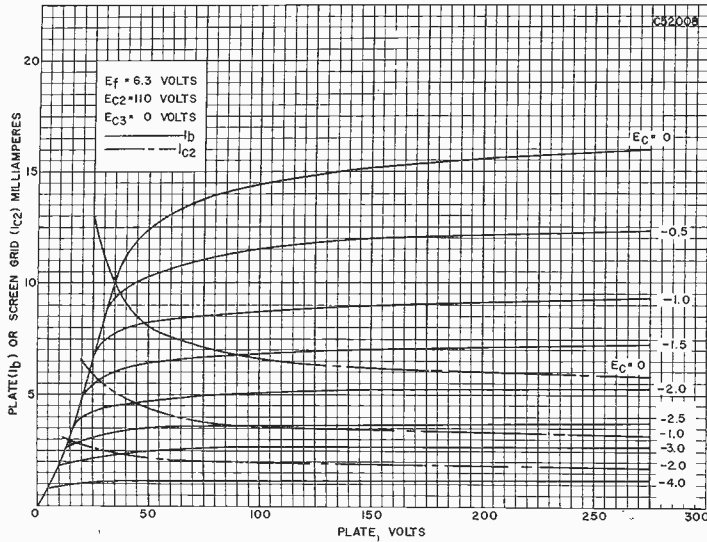
1952 Vol. 19, No. 4

W. H. Hannah, Jr., Technical Editor

Information in Sylvania News is furnished without assuming any obligations

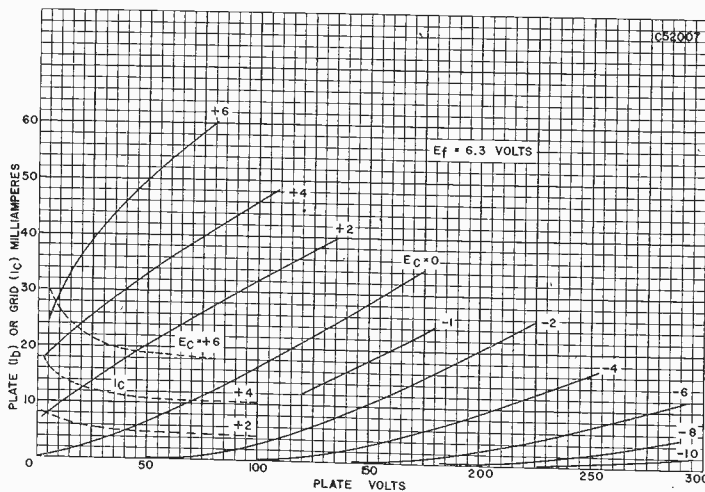
Sylvania Type 6U8

PENTODE SECTION
AVERAGE PLATE CHARACTERISTICS



Sylvania Type 6U8

TRIODE SECTION
PENTODE SECTION - TRIODE CONNECTED
AVERAGE PLATE CHARACTERISTICS



SYLVANIA RADIO TUBES

ne. The input circuit is designed to be fed from a balanced 300 ohm line. The change from balanced to unbalanced input is provided in the transformer, T₁.
The interstage coupling circuit is
(Continued on page 6)

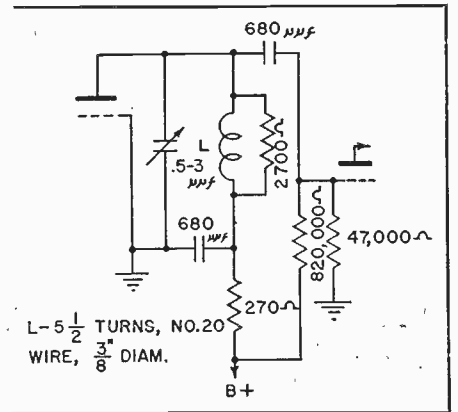


Figure 2. Alternate Single Tuned Interstage Circuit (where full 20 mc bandwidth is not required).

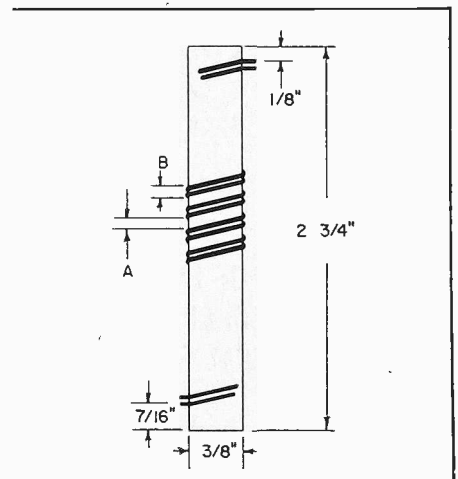


Figure 1A. Constants of Balancer Transformer T₁. Two of the above coils, each consisting of 33 bifilar turns, are required. They are mounted side by side (3/4" center to center) and shielded. A—Distance between bifilar turns: equal to space occupied by one bifilar turn. B—Bifilar turn: two No. 30 enameled wires, spaced the diameter of a No. 32 wire.

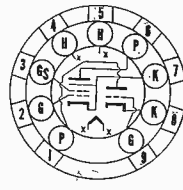
SYLVANIA EXHIBIT AT RADIO ENGINEER FEATURED MANY FA

Engineers shown testing of submini
microwave tubes. Tungsten and che



- Above photo shows the Sylvania exhibit at the 1952 New York City's Grand Central Palace.
- One of the crowds at the Sylvania exhibit that watched at Sylvania's plant in Kew Gardens, N. Y., demonstrate which all Sylvania Subminiature Tubes must pass.

NOTE; 6U7 data continued on page following this supplement.



9AE



Sylvania Type 6U8 HIGH FREQUENCY TRIODE PENTODE

PHYSICAL SPECIFICATIONS

| | |
|---------------------------|---------------------|
| Base | Small Button, 9-Pin |
| Bulb | T-6 $\frac{1}{2}$ |
| Maximum Bulb Length | 2 $\frac{3}{16}$ |
| Mounting Position | Any |
| Basing | 9-AE |

RATINGS

| | Triode Unit | Pentode Unit |
|--|-------------|--------------|
| Heater Voltage | 6.3 | 6.3 Volts |
| Maximum Plate Voltage | 300 | 300 Volts |
| Maximum Plate Dissipation | 2.5 | 2.8 Watts |
| Maximum Screen Voltage | | 300 Volts |
| Maximum Screen Dissipation | | 0.5 Watt |
| Minimum External Control Grid Bias | 0 | 0 Volts |
| Maximum Heater to Cathode Voltage | 90 | 90 Volts |

Direct Interelectrode Capacitances:

| | Shielded* | Unshielded |
|--|------------|--------------------|
| Pentode Unit | | |
| Grid No. 1 to Plate | 0.006 Max. | 0.01 μ f. Max. |
| Input | 5.0 | 5.0 μ f. |
| Output | 3.5 | 2.6 μ f. |
| Triode Unit | | |
| Grid to Plate | 1.8 | 1.8 μ f. |
| Grid to Cathode | 2.5 | 2.5 μ f. |
| Plate to Cathode | 1.0 | 0.4 μ f. |
| Cathode to Heater (Each Section) | 3.0 | 3.0 μ f. |

*RMA Std. Shield No. 315

TYPICAL OPERATION

| | Triode Unit | Pentode Unit |
|--|-------------|-----------------|
| Heater Voltage | 6.3 | 6.3 Volts |
| Heater Current | 450 | Ma. |
| Plate Voltage | 150 | 250 Volts |
| Screen Voltage | | 110 Volts |
| Cathode Resistor | 56 | 68 Ohms |
| Plate Current | 18 | 10 Ma. |
| Screen Current | | 3.5 Ma. |
| Plate Resistance | 0.005 | 0.4 Megohm |
| Transconductance | 8500 | 5200 μ mhos |
| Amplification Factor | 40 | |
| Control Grid Voltage for Plate Current of 10 μ a | -12 | -10 Volts |

APPLICATION

The Sylvania Type 6U8 is a 9-pin miniature triode-pentode. The two sections are electrically independent and capable of good performance at the higher frequencies. The tube may be used as a local oscillator-pentode mixer and many other combined functions in fm and tv receivers.

SYLVANIA RADIO TUBES

Issued as a supplement to the manual in SYLVANIA NEWS for April 1952

SYLVANIA
TECHNICAL

(Eight)

SUPPLIES

We are continuing with two more to the Eight Sylvania Tubes. Insertion of the 6U8 and 6A4 respectively, the data. However, placed at the top to indicate the data following items.

ATTENTION OF THE SYLVANIA TECHNICAL MANUAL EDITION, FIRST. The following basing diagram for Type 6BQ7. The diagram should be pasted over the This correction only in the Sylvania Manual, Eighth EDITION. PRINTING.



A Technical

SYLVANIA
ELECTRONIC

EMPORIUM,

TECHNICAL SECTION

APRIL 1952 Vol. 19, No. 4

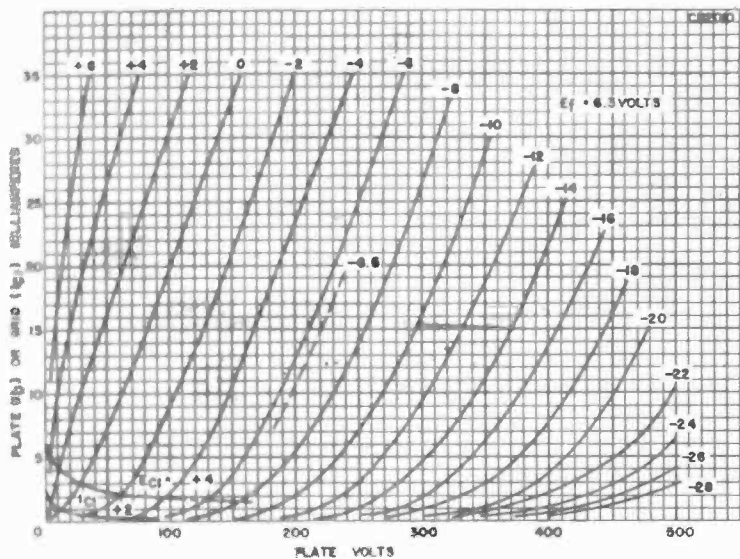
Alan Mahannah, Jr., Technical Editor

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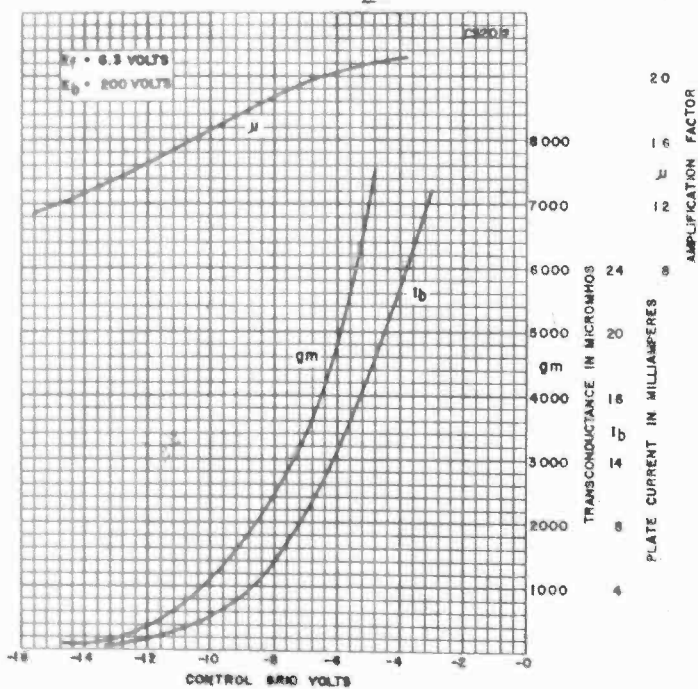
Engineer

6AK4 (cont'd)

Sylvania Type 6AK4
AVERAGE PLATE CHARACTERISTICS



Sylvania Type 6AK4
AVERAGE TRANSFER CHARACTERISTICS



SYLVANIA RADIO TUBES

line. The input circuit is designed to be fed from a balanced 300 ohm line. The change from balanced to unbalanced input is provided in the transformer, T_1 .

The interstage coupling circuit is
(Continued on page 6)

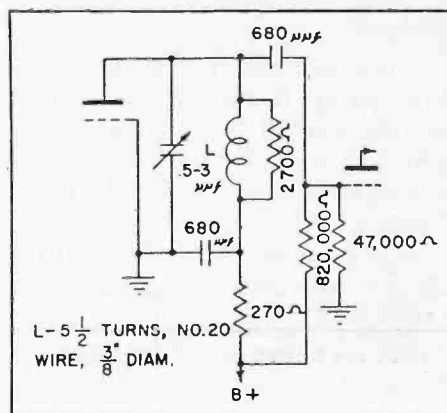


Figure 2. Alternate Single Tuned Interstage Circuit (where full 20 mc bandwidth is not required).

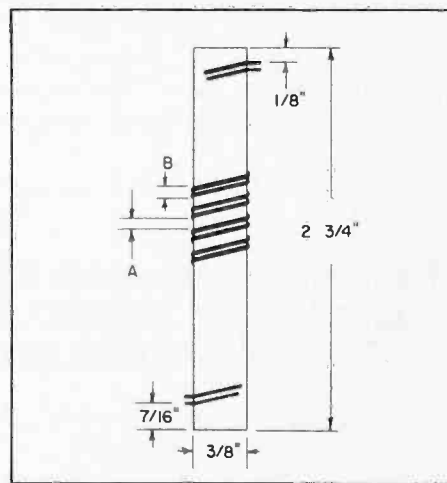


Figure 1A. Constants of Balancer Transformer T_1 . Two of the above coils, each consisting of 33 bifilar turns, are required. They are mounted side by side ($3/4$ " center to center) and shielded. A—Distance between bifilar turns: equal to space occupied by one bifilar turn. B—Bifilar turn: two No. 30 enameled wires, spaced the diameter of a No. 32 wire.

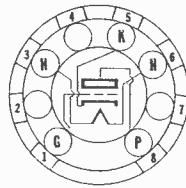
SYLVANIA EXHIBIT AT RADIO ENGINEER FEATURED MANY FA

Engineers shown testing of subminiature
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- Above photo shows the Sylvania exhibit at the 1952 Radio Engineers Convention in New York City's Grand Central Palace.
- One of the crowds at the Sylvania exhibit that waited at Sylvania's plant in Kew Gardens, N. Y., demonstrated the Sylvania Subminiature Tubes which all Sylvania Subminiature Tubes must pass.

NOTE; 6A15 data continued on page following this supplement.



8-DK



Sylvania Type 6AK4 HIGH FREQUENCY TRIODE

PHYSICAL SPECIFICATIONS

| | |
|--------------------------|-------------------------------------|
| Base..... | Subminiature Button, Flexible Leads |
| Bulb..... | T-3 |
| Maximum Bulb Length..... | 1.375" |
| Minimum Lead Length..... | 1.500" |
| Mounting Position..... | Any |
| Basing..... | 8-DK |

RATINGS

| | |
|--|-----------|
| Heater Voltage AC or DC..... | 6.3 Volts |
| Maximum Plate Voltage..... | 250 Volts |
| Maximum Heater to Cathode Voltage..... | 90 Volts |
| Maximum Plate Dissipation..... | 3.0 Watts |
| Maximum Cathode Current..... | 20 Ma. |

Direct Interelectrode Capacitances:

| | Shielded* | Unshielded |
|--------------------|-----------|--------------|
| Grid to Plate..... | 1.3 | 1.4 μ f. |
| Input..... | 2.0 | 1.8 μ f. |
| Output..... | 1.7 | 0.6 μ f. |

*With 0.405" diameter shield connected to cathode

TYPICAL OPERATION

| | |
|---|-----------------|
| Heater Voltage..... | 6.3 Volts |
| Heater Current..... | 150 Ma. |
| Plate Voltage..... | 200 Volts |
| Grid Voltage* Obtained from Self Bias Resistor of..... | 680 Ohms |
| Plate Current..... | 9.5 Ma. |
| Transconductance..... | 3800 μ mhos |
| Amplification Factor..... | 20 |
| Plate Resistance..... | 5300 Ohms |
| Grid Voltage for Plate Current Cut-Off to 10 μ a..... | -20 Volts |

*Provides an operating bias of approx. 6.5 volts.
Fixed bias operation is not recommended.

APPLICATION

Sylvania Type 6AK4 is a general purpose medium μ triode in the subminiature style. This tube is a commercial version of the 6K4 and is considered a replacement for it.

At frequencies of around 500 mc, an output of approximately $\frac{3}{4}$ watt may be obtained when used in a suitable circuit.

SYLVANIA RADIO TUBES

Issued as a supplement to the manual in SYLVANIA NEWS for April 1952

A HIGH PERFORMANCE BOOSTER FOR WEAK SIGNAL FM RECEPTION

TECHNICAL SECTION

APRIL 1952

Vol. 19, No. 4

E. Alan Mahannah, Jr., Technical Editor

This information in Sylvania News is furnished without assuming any obligations

By W. P. Mueller, Advanced Application Engineer

In the March, 1952, issue of SYLVANIA NEWS some aspects of long distance fm reception were discussed and means for improving reception in difficult locations were suggested. In weak signal areas, providing additional amplification to the receiver often produces true noise-free fm reception in striking contrast to the quality of the reception previously obtained.

The reason for this is that the weak signal available ordinarily does not produce adequate limiting in the receiver. If sufficient amplification is added to make the limiter or ratio detector stages operate at a high enough level to insure full limiting, a marked improvement in reception results. Of course, if the objective is to make the set work on extremely weak input signals, an input stage with the lowest possible noise factor

should be used. Because of the requirement for a low noise input stage, it is necessary to provide the additional amplification by adding a booster in front of the receiver, so that the amplification is at the signal frequency, 88 to 108 mc.

It is undesirable to add another tuning control in addition to the one on the receiver. Therefore, the booster should be untuned and broad band, to accept the entire 20 mc bandwidth. An untuned booster may be placed out of sight in some recess of the speaker cabinet, and the fm receiver may be operated with one tuning control, just as it was before.

A schematic diagram of an fm booster, possessing the features just described, is shown in Figure 1. It consists of a cascode input stage and an impedance matching output stage designed to feed a balanced 300 ohm

line. The input circuit is designed to be fed from a balanced 300 ohm line. The change from balanced to unbalanced input is provided in the transformer, T₁.

The interstage coupling circuit is
(Continued on page 6)

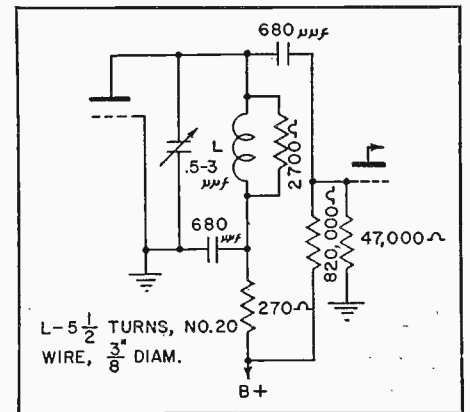


Figure 2. Alternate Single Tuned Interstage Circuit (where full 20 mc bandwidth is not required).

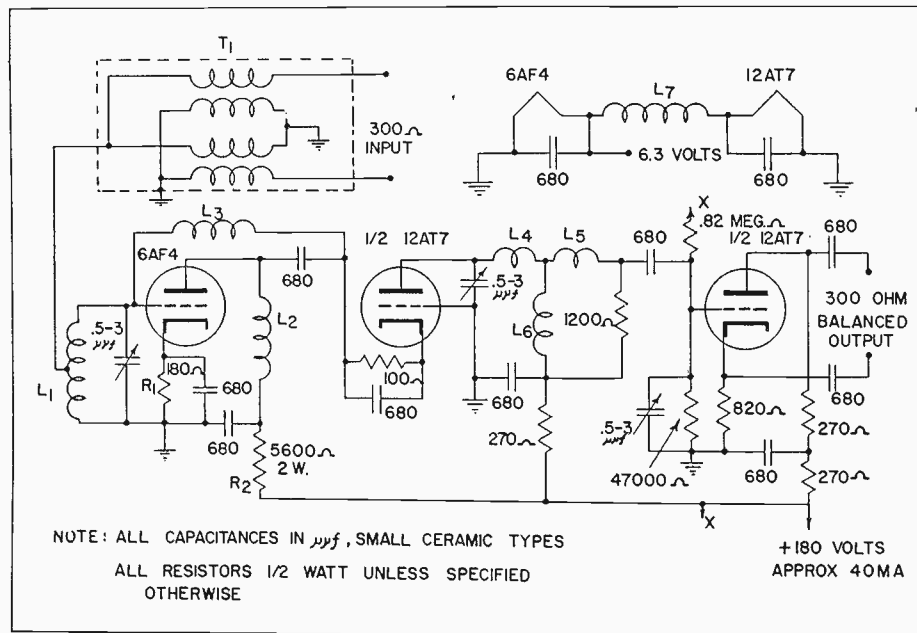


Figure 1. High Gain Broad Band Booster Circuit for FM.

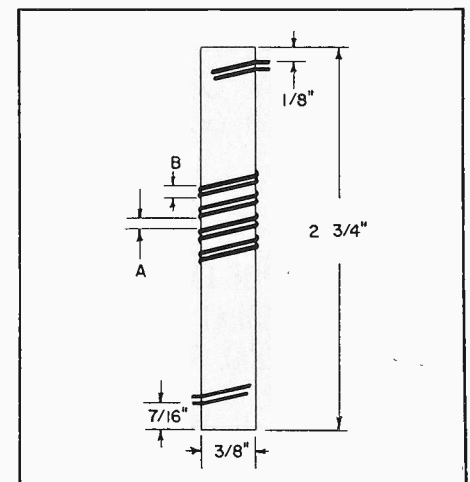


Figure 1A. Constants of Balancer Transformer T₁. Two of the above coils, each consisting of 33 bifilar turns, are required. They are mounted side by side (1/4" center to center) and shielded. A—Distance between bifilar turns: equal to space occupied by one bifilar turn. B—Bifilar turn: two No. 30 enameled wires, spaced the diameter of a No. 32 wire.

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an overcoupled, double tuned circuit, to provide the wide bandwidth of 20 mc. It is made up in the form of its equivalent "T" circuit, which permits the mutual coupling between the two circuits to be more easily adjusted. A sweep generator is required to properly align this circuit. If the sweep generator is not capable of the extremely wide sweep required, the final alignment may be touched up to cover the 20 mc band with an ordinary signal generator. The preliminary adjustments *must* be made with a sweep generator and oscilloscope, however. In the alignment, the primary, L_4 , and secondary, L_5 , are tuned by means of the trimmer capacitors. The mutual inductance is adjusted by distorting (changing the length of the winding) the coil, L_6 , until the required bandpass is obtained.

If it is not required to cover the entire band, that is, if the desired stations are all close together in frequency, a single tuned circuit may be substituted for the double tuned circuit. Such a circuit, which will provide a bandwidth of about 10 mc and is much easier to align, is shown in Figure 2.

The performance of the booster circuit of Figure 1 was determined by placing it in front of a representative fm receiver and measuring the quieting sensitivity. The quieting sensitivity is defined as the rf signal required to give a 30 db signal to noise ratio for a signal frequency modulated ± 22.5 kc. This corresponds to an output signal voltage

33 times the output noise voltage that is obtained with the same magnitude of unmodulated signal applied. The results are shown in Table I. It is apparent that the booster increased the effective sensitivity of the receiver by about 3 to 4.5 times. The actual voltage gain of the booster is about 10 times.

It must be emphasized that the signal levels shown in Table I are those required to provide full 30 db quieting, or true noise-free fm reception. It is, of course, possible to hear much weaker signals.

The performance of the booster described herein was obtained with a Sylvania experimental type tube in the first stage. This tube was designed for use as an oscillator in the new u h f - t v band, and is now commercially available as Type 6AF4. Other tube types may be used with slight changes in the coil constants. For example, a Type 6BQ7 double triode might be used in the first and second stage, and a Type 6AB4 in the output stage, with R_1 changed to 220 ohms and R_2 to 3300 ohms, $\frac{1}{2}$ watt.

COIL DATA (All coils self supporting)

- L_1 — 10 turns #20 E on $\frac{3}{8}$ " diam., $\frac{1}{2}$ " winding length tap at $3\frac{1}{2}$ turns
- L_2 — $9\frac{1}{2}$ turns #20 on $\frac{3}{8}$ " diam.
- L_3 — 29 turns #24 on $\frac{3}{16}$ " diam.
- L_4 — $10\frac{1}{2}$ turns #24 on $\frac{3}{8}$ " diam., $\frac{3}{8}$ " winding length
- L_5 — 8 turns #24 on $\frac{3}{8}$ " diam., $\frac{3}{8}$ " winding length
- L_6 — 4 turns #24 on $\frac{1}{4}$ " diam., $\frac{1}{2}$ " winding length
- L_7 — 12 turns #20 on $\frac{1}{4}$ " diam.

TABLE I

PERFORMANCE OF FM BOOSTER WITH DOUBLE-TUNED INTERSTAGE CIRCUIT. QUIETING SIGNAL SENSITIVITY FOR 30 DB SIGNAL TO NOISE RATIO. SIGNAL FM MODULATED 30% OR 22.5 KILOCYCLES.

| Frequency (mc) | Input Receiver Alone (μv) | Input with Booster (μv) | Increase in Quieting Sensitivity Due to Booster |
|----------------|----------------------------------|--------------------------------|---|
| 108 | 30 | 8 | 3.7 times |
| 106 | 16 | 5.5 | 2.9 " |
| 98 | 35 | 8 | 4.4 " |
| 90 | 35 | 10 | 3.5 " |
| 88 | 35 | 10 | 3.5 " |

The booster increased the sensitivity from 2.9 to 4.4 times through the band 88 to 108 megacycles.

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TV PICTURE TUBE VARIATIONS 

With the number of television picture tubes in existence today it has become exceedingly difficult to identify, by type number, their basic characteristics. A great deal of the difficulty has resulted from the addition of the suffixes A, B, C, etc. to the original type number. These suffixes usually indicate a change in face plate, screen structure, or the addition or omission of an external conductive coating. Since there is no simple pattern for assignment of suffixes, confusion results when trying to determine the exact differences between, for example, the 17BP4, 17BP4A, and 17BP4B.

The purpose of this chart is to provide a quick reference to cathode ray tube type variations. The chart contains information on recently released types, as well as more detailed information on those types published in the April 1951 SYLVANIA NEWS. **IT IS NOT INTENDED TO SERVE AS A SUBSTITUTION GUIDE.** Such information is available in the Sylvania Substitution Manual, obtainable free of charge from your Sylvania distributor or from the Advertising Department, Sylvania Electric Products Inc., Emporium, Pennsylvania.

TELEVISION PICTURE TUBE VARIATIONS

| TYPE | FACE Clear Frosted Alum. Tinted | BODY | | | FOCUS | DEFLEC- TION | TYPE | FACE Clear Frosted Alum. Tinted | BODY | | | FOCUS | DEFLEC- TION |
|--------|---|----------------------|----------------------|------------------------------|-------|-----------------|---------|---|----------------------|----------------------|------------------------------|---------|-----------------|
| | | Round or Rect. | Metal or Glass | External Cond. Coating | | | | | Round or Rect. | Metal or Glass | External Cond. Coating | | |
| 7JP4 | C | Round | G | No | Es | Es | 16QP4 | T | Rect. | G | No | Mag. | Mag. |
| 8AP4 | C | Round | M | | Mag. | Mag. | 16RP4 | T | Rect. | G | Yes | Mag. | Mag. |
| 8AP4A | T | Round | M | | Mag. | Mag. | 16SP4 | C | Round | G | Yes | Mag. | Mag. |
| 8BP4 | C | Round | G | No | Es | Es | 16SP4A | T | Round | G | Yes | Mag. | Mag. |
| 9AP4 | C | Round | G | No | Es | Mag. | 16TP4 | T | Rect. | G | Yes | Mag. | Mag. |
| 9CP4 | C | Round | G | No | Mag. | Mag. | 16UP4 | T | Rect. | G | No | Mag. | Mag. |
| 10BP4 | C | Round | G | Yes | Mag. | Mag. | 16VP4 | T | Round | G | No | Mag. | Mag. |
| 10BP4A | T | Round | G | Yes | Mag. | Mag. | 16WP4 | T | Round | G | No | Mag. | Mag. |
| 10CP4 | CA | Round | G | Yes | Mag. | Mag. | 16WP4A | T | Round | G | Yes | Mag. | Mag. |
| 10DP4 | CA | Round | G | No | Hi Es | Mag. | 16XP4 | T | Rect. | G | No | Mag. | Mag. |
| 10FP4 | CA | Round | G | Yes | Mag. | Mag. | 16YP4 | T | Round | G | Yes | Mag. | Mag. |
| 10FP4A | TA | Round | G | Yes | Mag. | Mag. | 16ZP4 | T | Round | G | Yes | Mag. | Mag. |
| 10GP4 | C | Round | G | No | Es | Es | 17AP4 | T | Rect. | G | Yes | Mag. | Mag. |
| 10HP4 | C | Round | G | No | Es | Es | 17BP4 | T | Rect. | G | No | Mag. | Mag. |
| 10MP4 | C | Round | G | Yes | Mag. | Mag. | 17BP4A | T | Rect. | G | Yes | Mag. | Mag. |
| 10MP4A | T | Round | G | Yes | Mag. | Mag. | 17BP4B | TA | Rect. | G | Yes | Mag. | Mag. |
| 12AP4 | C | Round | G | No | Hi Es | Mag. | 17CP4 | TF | Rect. | M | | Mag. | Mag. |
| 12CP4 | C | Round | G | No | Mag. | Mag. | 17CP4A | T | Rect. | M | | Mag. | Mag. |
| 12IP4 | C | Round | G | No | Mag. | Mag. | 17FP4 | T | Rect. | G | Yes | Hi Es | Mag. |
| 12KP4 | CA | Round | G | Yes | Mag. | Mag. | 17FP4A | T | Rect. | G | Yes | Hi Es | Mag. |
| 12KP4A | TA | Round | G | Yes | Mag. | Mag. | 17GP4 | TF | Rect. | M | | Hi Es | Mag. |
| 12LP4 | C | Round | G | Yes | Mag. | Mag. | 17HP4 | T | Rect. | G | Yes | Lo Es | Mag. |
| 12LP4A | T | Round | C | Yes | Mag. | Mag. | 17JP4 | T | Rect. | G | Yes | Mag. | Mag. |
| 12QP4 | C | Round | G | No | Mag. | Mag. | 17KP4 | T | Rect. | G | Yes | Auto. | Mag. |
| 12RP4 | C | Round | G | No | Mag. | Mag. | *17LP4 | T | Rect. | G | Yes | Lo Es | Mag. |
| 12TP4 | C | Round | G | No | Mag. | Mag. | *17QP4 | T | Rect. | G | Yes | Mag. | Mag. |
| 12UP4 | C | Round | M | | Mag. | Mag. | 17RP4 | T | Rect. | G | Yes | Zero Es | Mag. |
| 12UP4A | T | Round | M | | Mag. | Mag. | 17TP4 | TF | Rect. | M | | Lo Es | Mag. |
| 12UP4B | TF | Round | M | | Mag. | Mag. | 19AP4 | C | Round | M | | Mag. | Mag. |
| 12VP4 | C | Round | G | Yes | Mag. | Mag. | 19AP4A | T | Round | M | | Mag. | Mag. |
| 12VP4A | T | Round | G | Yes | Mag. | Mag. | 19AP4B | TF | Round | M | | Mag. | Mag. |
| 14AP4 | C | Round | G | No | Es | Es | 19AP4C | TA | Round | M | | Mag. | Mag. |
| 14BP4 | T | Rect. | G | Yes | Mag. | Mag. | 19AP4D | CF | Round | M | | Mag. | Mag. |
| 14CP4 | T | Rect. | G | Yes | Mag. | Mag. | 19DP4 | C | Round | G | Yes | Mag. | Mag. |
| 14DP4 | T | Rect. | G | No | Mag. | Mag. | 19DP4A | T | Round | G | Yes | Mag. | Mag. |
| 14EP4 | T | Rect. | G | Yes | Mag. | Mag. | 19EP4 | T | Rect. | G | Yes | Mag. | Mag. |
| 15AP4 | C | Round | G | No | Mag. | Mag. | 19FP4 | T | Round | G | No | Mag. | Mag. |
| 15CP4 | C | Round | G | No | Mag. | Mag. | 19GP4 | T | Round | G | No | Mag. | Mag. |
| 15DP4 | C | Round | G | No | Mag. | Mag. | 19JP4 | T | Rect. | G | No | Mag. | Mag. |
| 16AP4 | C | Round | M | | Mag. | Mag. | 20AP4 | C | Round | G | No | Es | Es |
| 16AP4A | T | Round | M | | Mag. | Mag. | 20BP4 | C | Round | G | No | Mag. | Mag. |
| 16CP4 | C | Round | G | No | Mag. | Mag. | 20CP4 | T | Rect. | G | No | Mag. | Mag. |
| 16DP4 | C | Round | G | No | Mag. | Mag. | 20CP4A | T | Rect. | G | Yes | Mag. | Mag. |
| 16DP4A | T | Round | G | No | Mag. | Mag. | 20DP4 | T | Rect. | G | No | Mag. | Mag. |
| 16EP4 | C | Round | M | | Mag. | Mag. | 20DP4A | T | Rect. | G | Yes | Mag. | Mag. |
| 16EP4A | T | Round | M | | Mag. | Mag. | 20FP4 | T | Rect. | G | No | Hi Es | Mag. |
| 16EP4B | TF | Round | M | | Mag. | Mag. | 20GP4 | T | Rect. | G | Yes | Hi Es | Mag. |
| 16FP4 | C | Round | G | No | Mag. | Mag. | 20HP4 | T | Rect. | G | No | Lo Es | Mag. |
| 16GP4 | T | Round | M | | Mag. | Mag. | 20HP4A | T | Rect. | G | Yes | Lo Es | Mag. |
| 16GP4A | C | Round | M | | Mag. | Mag. | 20JP4 | T | Rect. | G | Yes | Auto. | Mag. |
| 16GP4B | TF | Round | M | | Mag. | Mag. | 21AP4 | TF | Rect. | M | | Mag. | Mag. |
| 16GP4C | CF | Round | M | | Mag. | Mag. | 21DP4 | TF | Rect. | M | | Hi Es | Mag. |
| 16HP4 | C | Round | G | No | Mag. | Mag. | *21EP4 | T | Rect. | G | No | Mag. | Mag. |
| 16HP4A | T | Round | G | Yes | Mag. | Mag. | *21EP4A | T | Rect. | G | Yes | Mag. | Mag. |
| 16JP4 | C | Round | G | Yes | Mag. | Mag. | *21FP4 | T | Rect. | G | No | Lo Es | Mag. |
| 16JP4A | T | Round | G | Yes | Mag. | Mag. | *21FP4A | T | Rect. | G | Yes | Lo Es | Mag. |
| 16KP4 | T | Rect. | G | Yes | Mag. | Mag. | *21KP4A | T | Rect. | G | Yes | Auto. | Mag. |
| 16KP4A | TA | Rect. | G | Yes | Mag. | Mag. | 22AP4 | C | Round | M | | Mag. | Mag. |
| 16LP4 | C | Round | G | Yes | Mag. | Mag. | 22AP4A | T | Round | M | | Mag. | Mag. |
| 16LP4A | T | Round | G | Yes | Mag. | Mag. | 24AP4 | T | Round | M | | Mag. | Mag. |
| 16MP4 | C | Round | G | Yes | Mag. | Mag. | 24AP4A | TA | Round | M | | Mag. | Mag. |
| 16MP4A | T | Round | G | Yes | Mag. | Mag. | 30BP4 | T | Round | M | | Mag. | Mag. |

*Cylindrical Face Section

Auto—Automatic Electrostatic

Es—Electrostatic

Lo Es—Low Voltage Electrostatic

Hi Es—High Voltage Electrostatic

Mag.—Magnetic

Zero Es—Zero Voltage Electrostatic

Technical Section Index

JANUARY 1950 TO APRIL 1952

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*Vol. 1 Technical Sections
1935 to 1940 inclusive*

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1946 to date (loose-leaf)*

| | Vol. No. |
|---|----------|
| Additional Coil Data for Low Noise RF Amplifier..... | 19 - 2 |
| Antenna for UHF-TV Reception... | 19 - 3 |
| Are Tube Testers Necessary?..... | 18 - 9 |
| Ballast Tube Settings..... | 18 - 9 |
| Booster for Weak Signal FM Stations..... | 19 - 4 |
| CRT Test Adapter..... | 17 - 8 |
| CRT Variations (Chart)..... | 18 - 4 |
| Death on the Rooftop..... | 18 - 8 |
| Deflection Tubes & Circuits..... | 17 - 9 |
| Factory & Field Testing of TV Picture Tubes..... | 18 - 2 |
| FM-AM Signal Marker Generator as a TV Marker Generator..... | 17 - 3 |
| I F Circuits for TV (44 MC)..... | 17 - 8 |
| Impedance Step-Up of Folded Dipoles..... | 18 - 1 |
| Improved Test for OZ4 Tubes.... | 17 - 8 |
| Instrument for Measuring Picture Tube Color Response..... | 17 - 5 |
| Light Shield for Sylvania Oscilloscopes..... | 17 - 10 |
| Long Distance FM Reception..... | 19 - 3 |
| Modernization of Sylvania 139-140 Checkers for Type 1X2..... | 17 - 1 |
| New Developments in TV Tuners.. | 17 - 10 |
| Notes on Tube Tester Shorts Checks..... | 19 - 1 |
| Oscilloscope Calibrating Standard, Type 300..... | 18 - 7 |
| Oscilloscope for TV Analysis..... | 17 - 6 |
| Oscilloscope Modification for 120 Cycle Synchronization..... | 19 - 1 |
| Polymeter and High Voltage..... | 17 - 4 |
| Preamplifier for 139-140 Oscilloscope..... | 17 - 9 |
| Preamplifier for Use with Scope or Polymeter..... | 18 - 6 |
| Procedure for Installing 1 MC Crystal in Type 216 Signal Generator..... | 18 - 1 |
| R F Amplifier for TV..... | 18 - 10 |
| Raster Variations..... | 18 - 6 |

| | Vol. No. |
|--|----------|
| Remote TV Viewer or Slave Unit (I)..... | 18 - 4 |
| Remote TV Viewer (II)..... | 18 - 5 |
| Remote TV Viewer (III)..... | 18 - 6 |
| Resetting "D" Knobs on 219-220 Tube Testers..... | 18 - 2 |
| Resetting "G" Knobs on 139-140 Tube Testers..... | 18 - 7 |
| Servicing TV Set with Pull at Top of Picture..... | 18 - 11 |
| Signal Generator Connections in TV Alignment..... | 18 - 2 |
| Simple Capacity High Voltage Divider for Oscilloscope Measurement..... | 18 - 3 |
| Slave Oscilloscopes for Group Instruction..... | 18 - 3 |
| Suggestions for Using 219-220 Tube Testers..... | 17 - 9 |
| Summer Service for 3-Way Portables..... | 17 - 7 |
| Sylvania 1951 Polymeter..... | 18 - 3 |
| Sylvania TV and the Gold Room.. | 18 - 10 |
| Sylvania TV Marker Generator (I)..... | 18 - 7 |
| Sylvania TV Marker Generator (II)..... | 18 - 8 |
| Sylvania Tube Tester, Type 220.... | 17 - 2 |
| Testing CR Tubes on 228 Adapter.. | 18 - 10 |
| Testing 5642 Rectifier Tubes..... | 18 - 4 |
| Tube Tester Correlation Chart.... | 19 - 2 |
| Tube Testers May Oscillate..... | 18 - 5 |
| TV & F M Reactance Charts..... | 17 - 5 |
| TV-FM Sweep Signal Generator Type 500..... | 17 - 3 |
| TV Picture Tube Variations..... | 19 - 4 |
| TV Servicing By Picture Analysis (I)..... | 17 - 1 |
| TV Servicing By Picture Analysis (II)..... | 17 - 4 |
| TV Servicing By Picture Analysis (III)..... | 17 - 5 |
| TV Set Owners Want Larger Pictures..... | 17 - 7 |
| TV Set Servicing with an Oscilloscope, Part I..... | 19 - 1 |
| TV Set Servicing with an Oscilloscope, Part II..... | 19 - 2 |
| UHF—TV Circuitry..... | 18 - 11 |

SERVICE HINTS

| |
|---|
| Airline 84-HA-3002B and Halli-crafters T54-505—Distortion... 18 - 8 |
| Alignment Procedure for Receivers Without L.F. Padder..... 18 - 3 |
| Antenna Rotators..... 19 - 2 |
| Capehart CX33 (Unstable Sync)... 19 - 1 |
| Capehart CX33 (Washed Out Pic-ture)..... 19 - 1 |
| Car Antennas..... 17 - 4 |
| Colonial—Mopar 602..... 18 - 3 |

| | Vol. No. |
|--|----------|
| Dark Vertical Lines..... 18 - 8 | |
| Delco R - 1409 (Burning Out 3Q5GT)..... 17 - 2 | |
| Emerson TV 118B (Poor Bright-ness or Black Bars)..... 19 - 2 | |
| Firestone, Model 4-A-68..... 17 - 4 | |
| Freed-Eiseman, Model 46 (FM)... 17 - 4 | |
| Garod TV Receiver..... 18 - 3 | |
| GE 12T7 (Cleaning Picture Tube Face)..... 19 - 2 | |
| GE-F 63 (Howl After Replacing Output Transformer)..... 17 - 5 | |
| GE TV, Models 817 and 821..... 18 - 3 | |
| Hallcrafters 760 (No Hold on Horizontal Control)..... 18 - 8 | |
| Horizontal Running and Pulling... 19 - 2 | |
| Importance of Capacitors..... 19 - 1 | |
| Keeping Your Resistor Stock.... 17 - 4 | |
| Most TV Sets (AC Connection Substitute)..... 19 - 1 | |
| Philco 35-1285 Record Changer... 17 - 2 | |
| Philco 40-150 (Local Stations at Several Points on Dial)..... 19 - 1 | |
| Philco-Dodge C 4608 (Vibrator Trouble)..... 17 - 5 | |
| Philco TV, 1700-1800 (Blowing "B" Supply Fuse)..... 19 - 1 | |
| Phone Tip Jack Adapter..... 19 - 2 | |
| RCA 8BX5 (A C—D C) Micro-phonics Tubes..... 17 - 5 | |
| RCA T-121 (No Picture or Raster). 19 - 2 | |
| Removing Studs from Plastic Cab-i-nets..... 18 - 9 | |
| Replacing Resistors and Capacitors. 18 - 6 | |
| Service Manual Lectern..... 19 - 2 | |
| Squeaks and Howls in A C-D C Radios..... 17 - 4 | |
| Static in Car Radios..... 18 - 3 | |
| Stringing Dial Cable..... 18 - 6 | |
| Substituting PM Speaker for Elec-tro-Dynamic..... 17 - 2 | |
| Tube Replacement in English Sets 17 - 5 | |
| Tube Vise..... 19 - 1 | |
| TV Antenna Installation..... 18 - 9 | |
| Use for Hypodermic Needle in Shop..... 17 - 4 | |
| Watering Batteries in Portables... 18 - 3 | |
| Weak Converter Oscillation in 3-Way Portables..... 18 - 3 | |
| Zenith 4G800—Distortion..... 17 - 5 | |
| Zenith 28-T9 (No Cathode Voltage) 19 - 1 | |

EDITOR'S NOTE: The Technical Section Index, which appeared in the January issue of the NEWS (page 8), unfortunately did not include the listing of all Technical Section articles that were published in 1951. The complete index is presented here for the use of those servicemen who keep their copies for reference.

MERCHANDISING SECTION

APRIL 1952

Vol. 19, No. 4

**A 4-IN-1 MAGNETIC
SCREW DRIVER**

Free!

**WITH YOUR PURCHASE
OF SYLVANIA TUBES**

Your Sylvania Distributor will offer you . . . free . . . another great new serviceman's tool between April 1st and May 15th with your purchase of 100 Sylvania Receiving Tubes or 4 Sylvania TV Picture Tubes. This tool, designed especially for you, is Sylvania's 4-in-1 Magna-Tip Screw-Driver—the handiest screw driver you ever used.

A regular \$3.95 value, this fine tool is permanently magnetic and comes equipped with four interchangeable bits — two for slotted screws, two for Phillips head. (See photos at left and on the cover. Cover girl is model Louise Hyde.)







You can work faster, especially in remote or ordinarily inaccessible spots with this wonderful, new screw driver. An alnico magnet in the shank charges the bit with ten times the "pull" needed to hold the screw firmly while you place, start, and drive it home. It will never lose its magnetic force.

The Sylvania Magna-Tip is actually four screw drivers in one—and a hex driver to boot! Four hardened tool steel bits come with each tool. One bit is in the bit holder and three bits are housed in the special handle compartment.

With bit removed the Magna-Tip is a 1/4" hex driver. It magnetically holds hex head screws and permits quick driving and removal.

Your 4-in-1 Magna-Tip Screw Driver is waiting for you now at your Sylvania Distributor. Pick it up today. Remember he can make this great, free offer to you only until May 15th.



| | | |
|---|---|---|
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|  |  |  |

4 interchangeable bits—2 for slotted screws—2 for Phillips heads

Hardened Tool Steel

WALTER LUNDBLAD DOES THRIVING SERVICE BUSINESS IN ODEBOLT, IOWA DESPITE WHEELCHAIR



Operating a television sales and service business from a wheel chair is hardly the easiest thing in the world to do. But Walt Lundblad has managed to do it, and successfully too.

In the earlier part of his life, Walt had ideas of making a career of service in the Merchant Marine. He joined in 1934 and was progressing very well until he slipped and fell on the deck of his ship in 1937. What was apparently a routine accident resulted three years later in a total paralysis of both legs. Walt had suffered a dislocated disc in his spine which two operations at the U. S. Marine hospital in Baltimore failed to correct.

It was while he was in the hospital after the operations that the ideas which eventually brought about Walt's Radio & Television Service first came to Walt. "I realized that

I would have to take up another line of work," Walt explained, "so I decided to take a correspondence course in radio and electrical repair work."

For three years Walt was a patient in the hospital and for three years he studied for his future. After being discharged from the hospital, he came to live with his parents on a farm six miles south of Odebolt, Iowa. It was there that he completed his correspondence courses and began to tinker around on sets that needed service.

In 1946 he had a small shop built on his father's farm. When his parents moved to an Odebolt home, Walt's shop was moved in, too, and was placed behind the house.

Walt's service today includes the sale and repair of radios, television sets, and some small appliances.

Walt's TV installations are handled

by two men working under his supervision. When sets need service they are usually brought into Walt's shop by his customers.

Helping Walt get around is his auto specially equipped to enable him to drive. He says that the car is an invaluable asset to him in his work.

Another thing which Walt figures will help him greatly is a recently obtained portable antennae system which is already making it easy for him to put sets in homes on trial.

Walt Lundblad, in refusing to let his handicap conquer him, has built up a record of inspiring achievement. Enthusiastic about his business, he looks ahead with confidence. Judging from the progress he has made against the considerable odds he has faced in the past decade, who could predict anything but further success for Walt?

DON'T FORGET ABOUT SERVICING RADIOS WHEN YOU MAKE A TV SERVICE CALL

There are not many servicemen these days who, when calling in a home to repair a television receiver or to pull a TV chassis, ask the owner about possible radio receiver service. Virtually every home equipped with a television receiver has one or more radio receivers. The interest in TV receiver takes the play away from the radio receiver, to be sure, but in many cases this situation could help the alert service dealer do more business. Imagine how many radios in such homes, if defective, are immediately sent out for repair. Precious few, probably. That's why it's good business to ask about that "forgotten radio."

January TV Production Over December Average

Average weekly production of television receivers in January showed an increase of eight percent over December but a drop of 36 percent under the weekly average of the corresponding 1951 month, according to estimates compiled by RTMA. Radio production was seven percent under the December weekly average and 47 percent under the average of January of last year.

January TV production was estimated at 404,933 sets compared with 468,927 sets in December and 645,716 sets in January 1951. The January radio output was estimated at 632,455 sets compared with 851,195 radios produced in December. The December report covered a five-week period while the January estimates covered four weeks.

A breakdown of the January report showed production of 288,723 home sets, 68,433 portables, 195,147 auto sets and 80,152 clock radios. Sets with FM facilities totaled 39,754 in the month. In addition 9,376 TV sets containing FM circuits were manufactured.

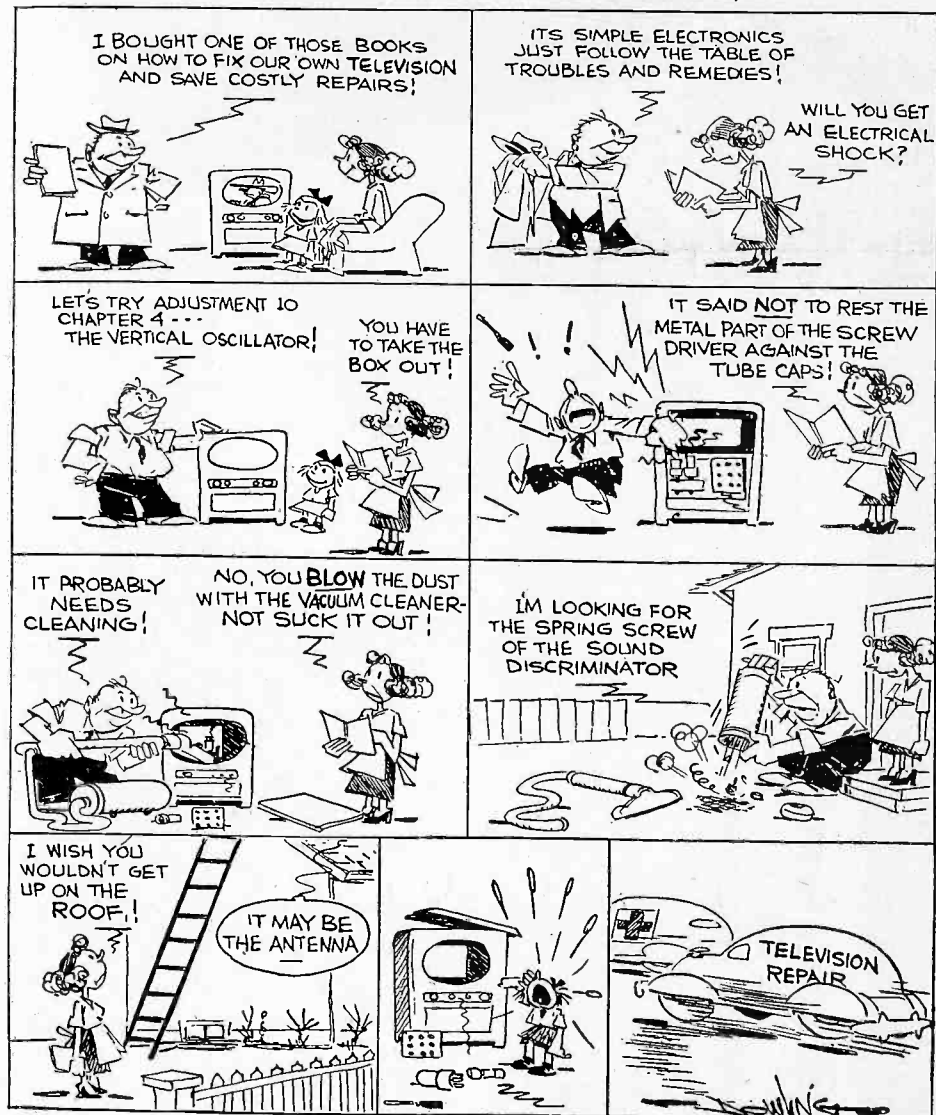
The power of suggestion is great; bring the radio receiver to the attention of the set owner, and having just had his television receiver repaired properly, he will be prone to have the defective radio set repaired. Just a simple "How are your radios operating; is there one you would like for me to look at while I'm here?" may serve to recall a buzzing radio to the owner's mind and get you another servicing job.

Radio servicing under such conditions is quite profitable. The cost of traveling to and possibly from the home is already paid for by the repair

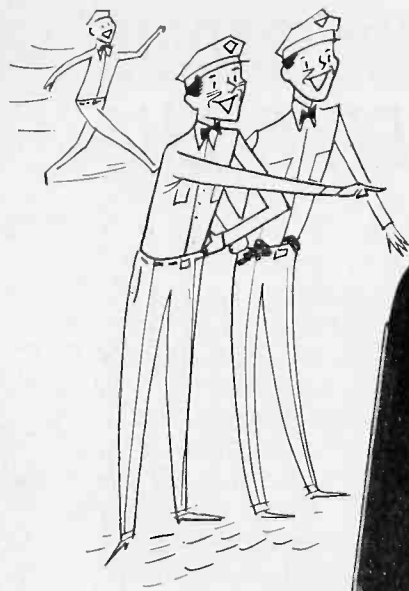
charge for the TV receiver. It is just as easy to return with a TV receiver and a radio receiver, as the former only. Getting this type of radio repair business is made very easy by a good television repair job.

It is like losing money when a serviceman does not do a selling job on the use of TV and radio in the average home. Many customers, if made conscious of their radio equipment, will have their defective receivers repaired. Whatever may be the percentage of success in this direction, it is added income with relatively little time and effort.

HOW TO FIX YOUR OWN TELEVISION SET



Copyright, 1952, New York Herald Tribune Inc.



New, Low Cost Electric Sign Can Help Get You More Customers

A new, low-cost illuminated electric sign for radio-television service dealers is now available from your Sylvania Distributor at \$3.50 post-paid. This is the least expensive store identification of this type Sylvania has ever offered.

A real eye-catcher, this sign is in three colors. Brilliant big red letters, edged with black . . . bright yellow background. A clear glass panel protects the sign (10 x 11 inches). The case which is 4 inches at its greatest depth is heavy gauge steel in gray hammertone finish. It contains a 40 watt bulb (furnished with sign) which operates on AC or DC current.

The heart of this new electric sign is the Sylvania Radio-Television Service Emblem. This famous emblem identifies you as the one recommended by movie, radio, theatre, television, and sports stars in Sylvania's advertising in national magazines and television.

When you put this sign on display in your shop, you are identifying yourself with Sylvania's advertising of your service.

You can get your illuminated electric sign from your Sylvania Distributor today. Why don't you pick one up and start letting it work for you?

SYLVANIA NEWS

SYLVANIA ELECTRIC PRODUCTS INC.
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Vol. 19, No. 4

APRIL 1952

PUBLISHED BY
SYLVANIA ELECTRIC PRODUCTS INC.

MANUFACTURERS OF SYLVANIA RADIO TUBES, CATHODE RAY TUBES, ELECTRONIC DEVICES, FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, ELECTRIC LIGHT BULBS, PHOTOLAMPS, RADIO AND TELEVISION RECEIVERS.

In This Issue

NEWS

SYLVANIA CARAVAN
WESTWARD BOUND

MERCHANDISING

A FREE 4-IN-1
MAGNETIC SCREW DRIVER

TECHNICAL

A HIGH PERFORMANCE
BOOSTER FOR WEAK SIGNAL
FM RECEPTION

SYLVANIA NEWS

JUNE - JULY, 1952



C. J. Lutten, editor
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Sylvania Electric Products Inc.
Vol. 19, No. 6

THIRTY PIONEER BROADCASTERS HONORED BY SYLVANIA BILLIONTH TUBE AWARDS

Thirty pioneer broadcasting personalities were recently honored at a luncheon attended by 200 representatives of show business, press and the radio and television industry.

Simultaneously, President Truman was presented with a plaque by Don Mitchell, president of Sylvania, at a White House ceremony on the occasion of his company's production of one billion radio tubes. Mr. Truman received a gold replica of the billionth tube identical to the Pioneer Broadcasting Awards.

Awards were presented by Max F. Balcom, Sylvania's board chairman, "in recognition of pioneering contributions to broadcasting." They were presented to Amos and Andy, Jack Benny, Burns & Allen, Bing Crosby, Arthur Godfrey, Fibber McGee & Molly, John Reed King, Ted Mack, Kate Smith, Sigmund Spaeth, Lowell Thomas, Ed Wynn, Fred Waring, Paul Whiteman, H. V. Kaltenborn, James Melton, Jessica Dragonette, Ben Grauer, Gertrude Berg, Milton J. Cross, Lanny Ross, Norman Brokenshire, John B. Gambling, Thomas H. Cowan, Phil Cook, Patt Barnes and John Daly. The last twelve of the broadcasters were present at the luncheon.

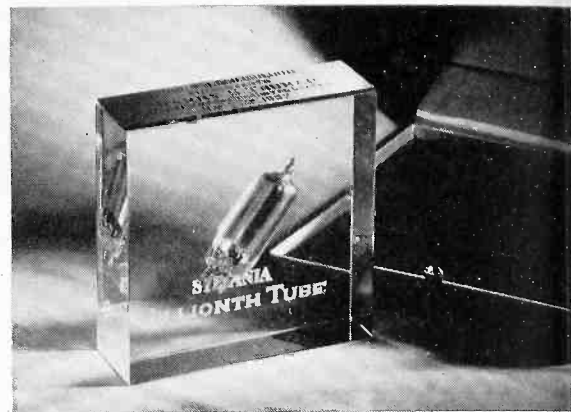
Main speaker was E. Finley Carter, vice president in charge of engineering for Sylvania. He saluted Dr. Lee DeForest, inventor of the amplifying tube, as the "father of radio and television," and presented him with the actual billionth tube.

He declared that the honored broadcasters had played a "pioneer's role filled with sacrifices and frustrations not unlike those of the early scientists and engineers." He said the stimulation of public interest by pioneer broadcasters was the background for the engineering and production miracles that gave us electronic superiority in the last war and in today's military program.

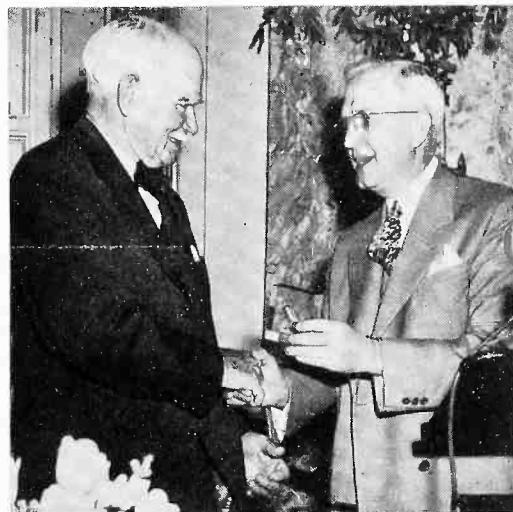
"We are still only on the threshold," Carter continued. "I can visualize simple and effective electronic 'brains' as an essential part of every vehicle that can move faster than 25 miles an hour to insure a safer and more effective flow of traffic. Electronic devices now possible might well reduce our accident death tolls by tens of thousands each year, and the injured by more than one million each year."

"Electronics," Mr. Carter concluded, "has created a medium through which artists, educators, religious and political leaders can reach the hearts of people. You pioneers must guard against the abuse of such a creation."

Milton Cross was master of ceremonies for the Billionth Tube Pioneer Award presentations. He recalled the early days of radio broadcasting and his first association with Sylvania in 1928 on the singing team known as "The Foresters." With each presentation he told anecdotes about the award winner's early efforts.



President Truman was presented a replica of Sylvania's billionth tube (shown above) by Sylvania president Don Mitchell in a ceremony at the White House in Washington, D. C.



Dr. Lee De Forest (at left), inventor of the amplifying tube, is shown receiving the one billionth radio tube manufactured by Sylvania Electric Products Inc. from the company's board chairman, Max F. Balcom. The presentation was made at a Pioneer Award Luncheon in New York.

Dayton Honors Sylvania Billionth Tube Celebration

Dayton, Ohio, played host to a national promotion sponsored by Sylvania Electric when one of the tubes in Sylvania's second billion series made its way into that city. The tube, which carried a Nassau cruise as its prize, was released through normal trade channels and shipped to Dayton where it was purchased by Mr. and Mrs. Clarence Menker of that city.

Harold Rainier, sales manager of Sylvania's tube replacement division, presented a plaque commemorating

the occasion to John Hain, President of Srepc, Inc., distributors of the tube.

Rainier likened the growth of Srepc from a small beginning to distributor of more than a million Sylvania tubes to the growth of Sylvania.

Hain then presented a plaque to W. M. Rankin, of Rankin Radio, whose firm sold the special tube to Menker as a replacement for one of his worn out tubes.

Daytonians welcomed the celebration featuring the billionth tube with tremendous enthusiasm. Roxanne,

star of *Beat the Clock*, arrived in Dayton on the morning of the presentation and was met by Messrs. H. E. Ruble, Lyndon Francis, "Buck" Arnold and John Hain of Srepc, accompanied by Bruce McEvoy of Sylvania with a Cadillac bearing signs welcoming her to Dayton. Following this she was whisked away to appear on four local television shows and to explain the sale which brought her to Dayton. Later that day, Roxanne paid visits to both Srepc and Rankin Radio.

MORE THAN 75 MILLION RADIO SETS, 17 MILLION TV SETS MADE IN FIVE YEARS

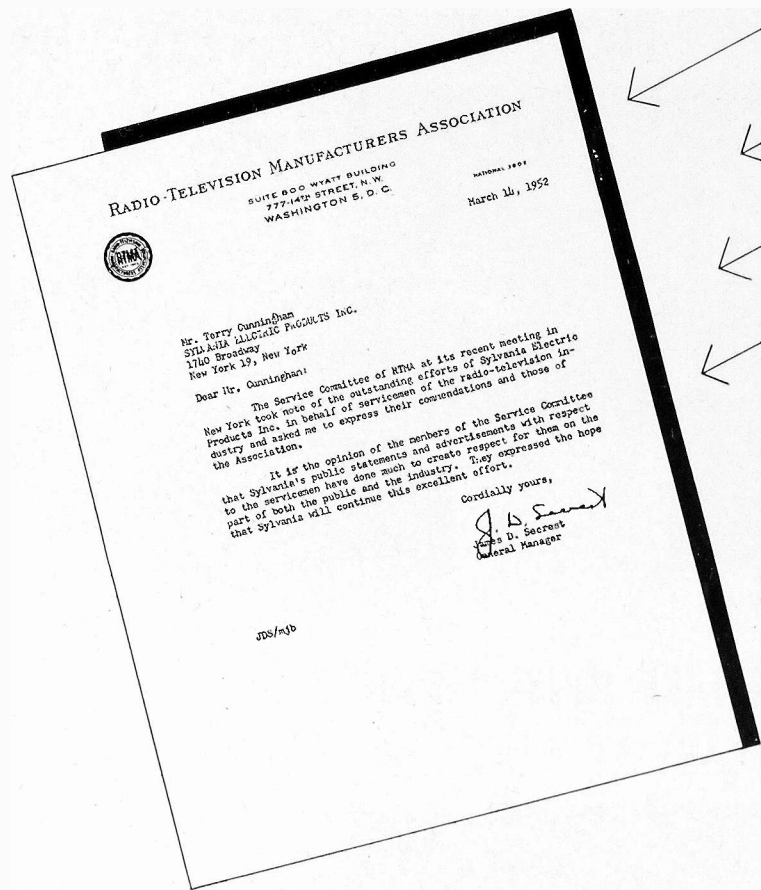
Production of radios and television receivers from 1947 through 1951 totaled 75,117,262 and 17,002,169 sets, respectively, according to revised industry estimates released today by RTMA. RTMA estimated the manufacturers' value of the five-year radio output at \$2,175,936,597, while the TV value was placed at \$3,166,986,300.

The RTMA Statistical Department has issued a 29-page booklet placing all set production statistics for the past five years on an industry estimated basis. The revised production statistics cover both non-members and members of the Association. Copies of the new booklet, which includes charts and tables, are being sent to all RTMA members.

For the first time, RTMA statistics are broken down to reflect foreign sales of radio and television receivers. This report showed shipment of 231,802 home radios and 56,075 TV sets during 1951.

An interesting feature of the 1947-51 report is the growth of automobile set production from 3,459,061 in 1947 to 4,542,920 last year. Auto set production rose from 17 per cent of the total radio output in 1947 to 36 per cent in 1951.

The per cent of home sets has



**RTMA
Service
Committee
Lauds Sylvania**

The above letter speaks for itself about the continual support Sylvania gives America's radio and television service dealers.

declined constantly in relation to the total radio output except for 1950. In 1947, 14,082,662 units were manufactured, accounting for 70 per cent of total production, while in 1951 only 6,751,452 units were produced, or 53 per cent of the output.

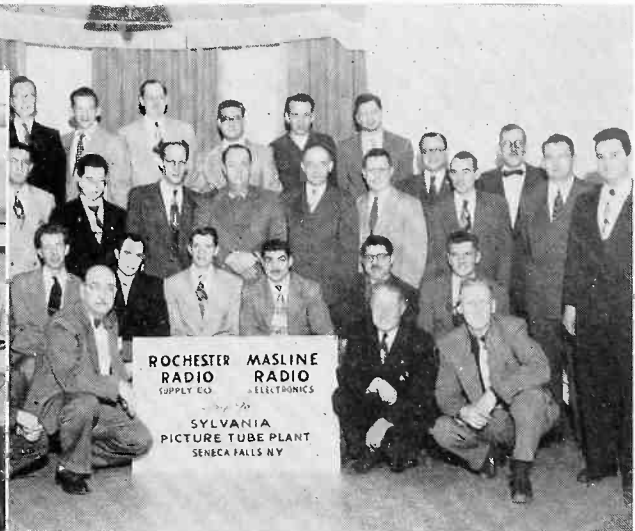
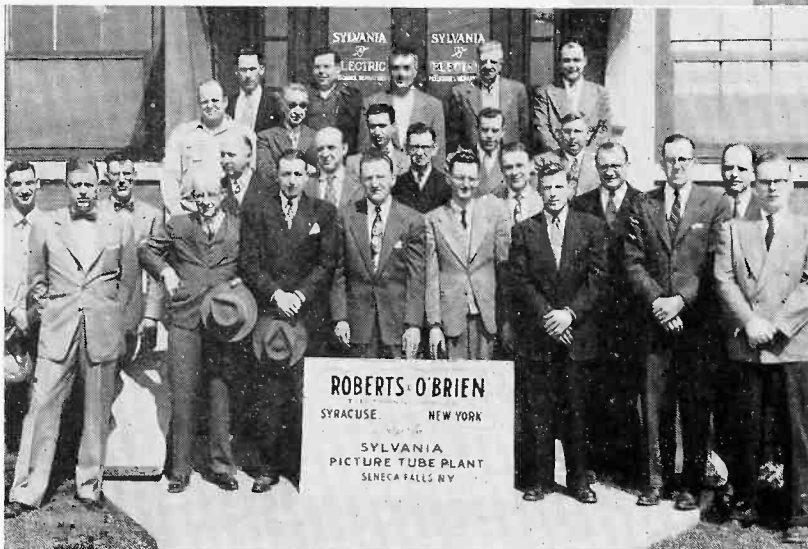
At the same time console and console television production has increased from 21 per cent of the total in 1947 to 52 per cent in 1951. This has been largely at the expense

of table model TV receivers which represented 65 per cent in 1947 but only 42 per cent last year.

Television set production for the five-year period is broken down as follows: table models 7,772,976; consoles and consolettes, 7,800,359 and phonograph combinations, 1,428,834. Phonograph combinations represented 14 per cent of the total TV output in 1947 but only six per cent in 1951.

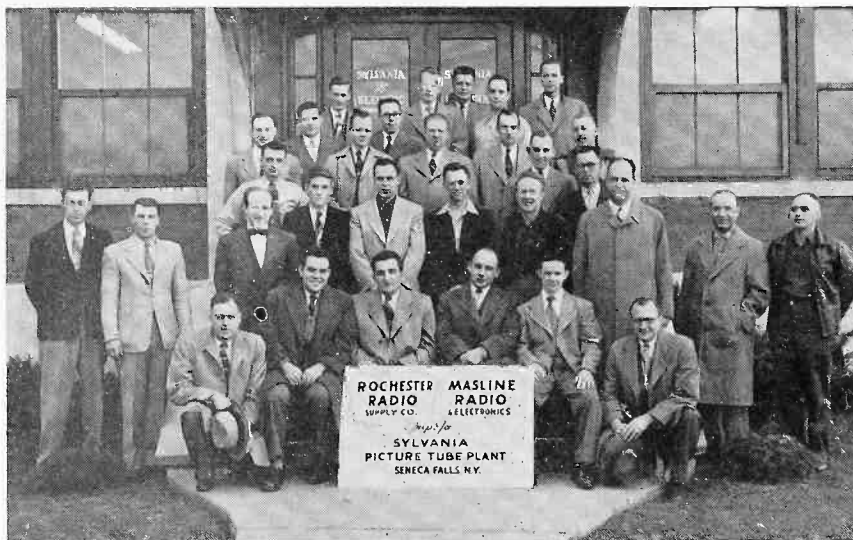


Left to right: John Hain, Srepco Distributor; Harold Rainier, Sylvania; Marshall Rankin, of Rankin Radio; Mrs. Clarence Menker (holding award); Roxanne; Mr. Clarence Menker; and Dayton Mayor Louis Lohrey.



SERVICEMEN TAKE TOURS THROUGH SYLVANIA PLANT AT SENECA FALLS

SYLVANIA APPOINTS T. R. SWENSON



T. R. Swenson, formerly account specialist for Sylvania, has been transferred to the distributor sales staff, according to an announcement by H. H. Rainier, manager of distributor tube sales.

Swenson joined Sylvania early in 1951. During the past year he has been employed in the Emporium tube plant where he worked as an account specialist. He is a graduate of Lafayette College.

In his new post Swenson will work closely with dealers and distributors in the New York City area. He will make his headquarters at the Sylvania offices at 1740 Broadway,

Three groups of servicemen recently saw "the story of highest quality Sylvania Picture Tubes" by way of tours through the Sylvania plant at Seneca Falls, N. Y. These tours were sponsored by Rochester Radio and Masline Radio (jointly for two of the visits) and by Roberts & O'Brien of Syracuse. These Sylvania Distributors provided buses which took the servicemen to and from the plant. Sylvania served luncheon to all three groups before the beginning of each tour.

Each tour included inspection of the following operations: life tests; incoming material inspection; finish-

ing; raw bulb inspection; solution room; settling; screen inspection; bulb wash; internal coating; parts processing; mounting; mount inspection; lehr baking and screen inspection; sealing; exhausting; final testing; color room; and offices. During the process valuable and expensive equipment such as settling belts, bulb washers, twelve-inch lehrs, screen inspection equipment, sealing equipment, in-line and straight-line exhaust equipment, aging conveyors and test equipment was shown.

The pictures above show the three groups of servicemen as well as their hosts.



T. R. SWENSON

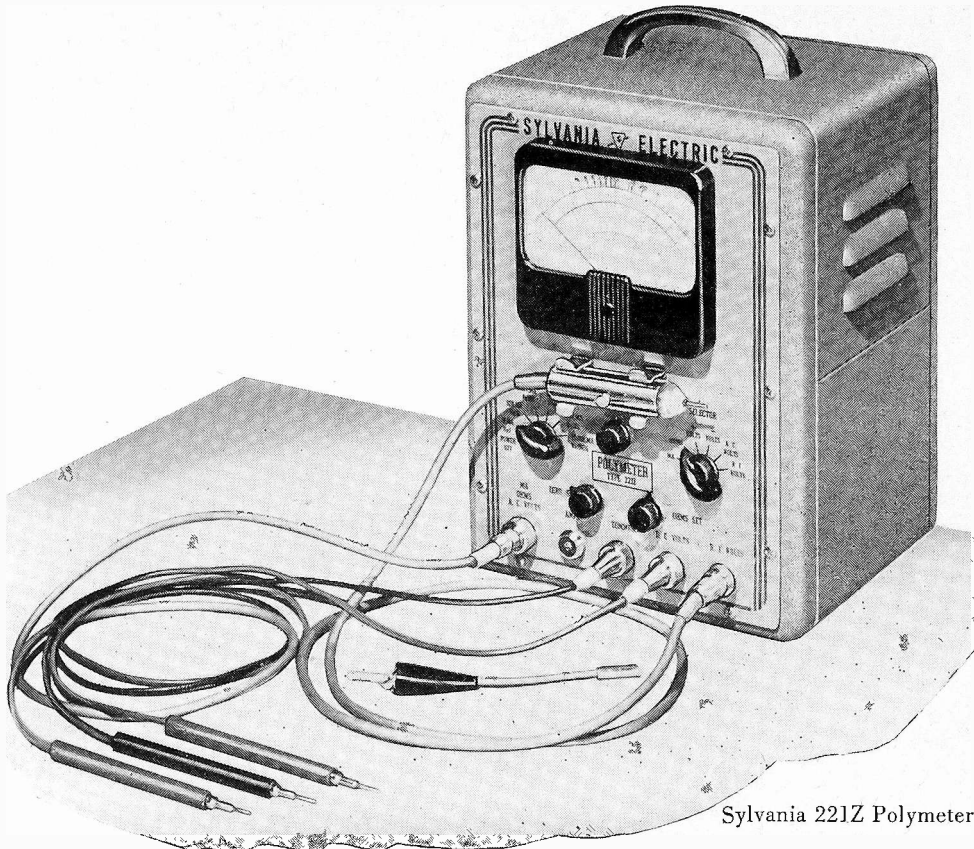
This information in Sylvania News is furnished without assuming any obligations

MAXIMUM ACCURACY FROM THE POLYMER

By W. O. Hamlin - Technical Publications Section

Vol. 1: \$1.00 — Vol. 2: \$1.00 — Vol. 3: \$1.00

Binders With Complete File of Technical Sections:



Sylvania 221Z Polymer.

The Sylvania Polymer 221Z is one of the most accurate servicing instruments on the market. It measures with a precision approaching that of expensive laboratory equipment. When compared with other VTVM's, the Sylvania Polymer offers current reading facilities from 3 ma to 10 amps, not usually found in such instruments; plus the very valuable RF Probe capable of measuring voltages as high as 300 volts. The two-stage, double-triode circuit utilizing an unusually large amount of inverse feedback gives high sensitivity and stability. The high sensitivity of the circuit allows use of 17 megohms input impedance on d c compared with the usual 11 megohms, and similar higher imped-

ances with lower shunt capacitance on a c ranges. These extra features accumulate to make the Polymer a truly fine instrument which is reliable, versatile and extremely useful to the serviceman and engineer alike.

To realize all the built-in accuracy of the Polymer, certain care must be taken in its use and maintenance. Let us analyze the Polymer and its variables to find out how to get peak performance from the meter at all times.

WARM-UP AND ZERO SET

The first consideration is to give it a sufficient warm-up period. The vacuum tubes, which make possible the extremely high input impedance

and sensitivity, must come to operating temperature before they will function properly. After *three minutes* the zero set knob can be adjusted for zero reading on the -3 volt range, but any measurements taken will not have maximum accuracy because the Polymer has not reached a stable temperature. It will reach stability after fifteen minutes of warm-up; another zero set will give accuracies within the limits of Table I.

The same warm-up period applies for resistance measurements. The full scale and zero adjustments should be made after a three minute warm-up and readjusted after fifteen minutes. The zero set can be made with the SELECTOR switch on (-) volts and the RANGE switch on R x 1; the battery will be discharged unnecessarily if the ohmmeter leads are shorted to make this adjustment directly on the OHMS scale. Then, turn the SELECTOR switch to OHMS, the RANGE switch to the scale desired, and set the pointer to full scale with the OHMS SET.

MAINTENANCE

The Polymer is a rugged instrument and needs the barest essentials of maintenance. However, after long use the tubes will lose some of their efficiency and should be replaced.

This is indicated when the d c range cannot be properly set to zero even after a fifteen minute warm-up period. The 7N7 tubes may be replaced without adjustment. The aging of the 5679 tube may cause a variation in zero set from a c to d c operation. If this is appreciable, recalibrate the a c zero set (see Polymer Operating Manual for procedure).

The batteries are used only in resistance measurements and the

(Continued on page 10)

BY-SERVICE CLASSIFICATION—PART II

The following *BY-SERVICE* listing of tubes has been prepared to assist the service technicians and engineers in selecting suitable substitutions for types not listed in charts or when a major change in power supply is undertaken. Although only the basic characteristics are listed these are sufficient to eliminate the majority of tubes not suitable for the particular application. Thus, the user can quickly select a group of possible tubes and then eliminate, by individual examination, those which for other reasons may be undesirable.

Since it is impossible to include the complete *BY-SERVICE* listing of tubes in this issue of *SYLVANIA NEWS*, watch the next issue for continuation of the chart.

| CONVERTERS | | | | | Type | E _f | I _f | Style | G _c |
|------------|----------------|----------------|----------|----------------|------------------------------|----------------|----------------|-------------|----------------------------|
| Type | E _f | I _f | Style | G _c | 12SY7 | 12.6 | 0.15 | Metal | 450 |
| 1A6 | 2.0 | 0.06 | ST-12 | 275 300 | 14B8 | 12.6 | 0.15 | Lock-in | 360 550 |
| 1A7GT | 1.4 | 0.05 | GT | 250 | 14J7 | 12.6 | 0.15 | Lock-in | 280 |
| 1B7GT | 1.4 | 0.10 | GT | 350 | 14Q7 | 12.6 | 0.15 | Lock-in | 290 525 |
| 1C6 | 2.0 | 0.12 | ST-12 | 300 325 | 14S7 | 12.6 | 0.15 | Lock-in | 500 525 |
| 1C7G | 2.0 | 0.12 | ST-12 | 300 325 | 26D6 | 26.5 | 0.07 | Min. | 270 455 475 |
| 1C8 | 1.25 | 0.04 | T-3 | 100 | FM1000 | 6.3 | 0.30 | Lock-in | |
| 1D7G | 2.0 | 0.06 | ST-12 | 275 300 | 1612 | 6.3 | 0.30 | Metal | 350* |
| 1L6 | 1.4 | 0.05 | Min. | 300 | *Require separate oscillator | | | | |
| 1LA6 | 1.4 | 0.05 | Lock-in | 250 | DIODE DETECTORS | | | | |
| 1LB6 | 1.4 | 0.05 | Lock-in | 100 | <i>Single and Double</i> | | | | |
| 1LC6 | 1.4 | 0.05 | Lock-in | 250 275 | Type | E _f | I _f | Style | Output Current Ma/Plate |
| 1R5 | 1.4 | 0.05 | Min. | 235 300 | 1A3 | 1.4 | 0.150 | Min. | 0.5 |
| 1U6 | 1.4 | 0.025 | Min. | 260 275 | 1R4 | 1.4 | 0.150 | Lock-in | 1.0 |
| 2A7/2A7S | 2.5 | 0.80 | ST-12 | 360 550 | 2S/4S | 2.5 | 1.35 | ST-12 | 40.0 |
| 6A7/6A7S | 6.3 | 0.30 | ST-12 | 360 550 | 6AL5 | 6.3 | 0.30 | Min. | 9.0 |
| 6A8 | 6.3 | 0.30 | Metal | 360 550 | 6AN6 | 6.3 | 0.20 | Min. | 8.0 |
| 6A8C | 6.3 | 0.30 | ST-12 | 360 550 | 6BC7 | 6.3 | 0.45 | T-6½ | 12.0 |
| 6A8GT | 6.3 | 0.30 | GT | 360 550 | 6H4GT | 6.3 | 0.15 | GT | 4.0 |
| 6AN7 | 6.3 | 0.23 | T-6½ | 750 | 6H6/GT | 6.3 | 0.30 | Metal/GT | 8.0 |
| 6BA7 | 6.3 | 0.30 | T-6½ | 900 950 | 7A6 | 6.3 | 0.15 | Lock-in | 8.0 |
| 6BE6 | 6.3 | 0.30 | Min. | 455 475 | 7C4 | 6.3 | 0.15 | Lock-in | 5.0 |
| 6D8C | 6.3 | 0.15 | ST-12 | 325 550 | 12AL5 | 12.6 | 0.15 | Min. | 9.0 |
| 6J8C | 6.3 | 0.30 | ST-12 | 290 | 12H6 | 12.6 | 0.15 | Metal | 8.0 |
| 6K8 | 6.3 | 0.30 | Metal | 350 | 5679 | 6.3 | 0.15 | Lock-in | 8.0 |
| 6K8C/GT | 6.3 | 0.30 | ST-12/GT | 350 | 5726 | 6.3 | 0.30 | Min. | 9.0 |
| 6L7 | 6.3 | 0.30 | Metal | 350* | 9006 | 6.3 | 0.15 | Min. | 5.0 |
| 6L7C | 6.3 | 0.30 | ST-12 | 350* | DIODE-PENTODES | | | | |
| 7A8 | 6.3 | 0.15 | Lock-in | 375 550 | Type | E _f | I _f | Style | G _m |
| 7B8 | 6.3 | 0.3 | Lock-in | 360 550 | 1AF5 | 1.4 | 0.025 | Min. | 500 600 |
| 7J7 | 6.3 | 0.30 | Lock-in | 280 290 | 1F6 | 2.0 | 0.06 | ST-12 | 650 |
| 7Q7 | 6.3 | 0.30 | Lock-in | 525 550 | 1F7G | 2.0 | 0.06 | ST-12 | 650 |
| 7S7 | 6.3 | 0.30 | Lock-in | 500 525 | 1F7GV | 2.0 | 0.06 | ST-12 | 650 |
| 12A8GT | 12.6 | 0.15 | GT | 360 550 | 1LD5 | 1.4 | 0.05 | Lock-in | 550 575 |
| 12BA7 | 12.6 | 0.15 | T-6½ | 900 950 | 1N6G | 1.4 | 0.05 | GT | 800 |
| 12BE6 | 12.6 | 0.15 | Min. | 455 475 | 1S5 | 1.4 | 0.05 | Min. | 625 |
| 12K8 | 12.6 | 0.15 | Metal | 350 | 1SB6GT | 1.4 | 0.05 | GT | 665 500 |
| 12K8GT | 12.6 | 0.15 | GT | 350 | 1U5 | 1.4 | 0.05 | Min. | 625 |
| 12SA7 | 12.6 | 0.15 | Metal | 425 450 | 2B7/2B7S | 2.5 | 0.80 | ST-12 | 950 |
| 12SA7GT | 12.6 | 0.15 | GT | 425 450 | 6B8/G | 6.3 | 0.30 | Metal/ST-12 | 950 |
| | | | | | 6B8GT | 6.3 | 0.30 | GT | 950 |
| | | | | | 6N8 | 6.3 | 0.30 | T-6½ | 2200 |
| | | | | | 6SF7 | 6.3 | 0.30 | Metal | 1975 2050 |
| | | | | | 6SV7 | 6.3 | 0.30 | Metal | 3600 |
| | | | | | 7E7 | 6.3 | 0.30 | Lock-in | 1600 1300 |
| | | | | | 7R7 | 6.3 | 0.30 | Lock-in | 2100 3000 |
| | | | | | 12C8 | 12.6 | 0.15 | Metal | 950 |

DIODE-PENTODES

| Type | E _f | I _f | Style | Gm |
|-------|----------------|----------------|---------|--------------|
| 12SF7 | 12.6 | 0.15 | Metal | 1975 2050 |
| 14E7 | 12.6 | 0.15 | Lock-in | 1600 1300 |
| 14R7 | 12.6 | 0.15 | Lock-in | 2100 3000 |

DIODE TRIODES (DETECTOR-AMPLIFIER)

Single Diode Triode—Duo Diode Triode
Triple Diode Triode

| Type | E _f | I _f | Style | μ |
|----------|----------------|----------------|----------|--------------|
| 1B5 | 2.0 | 0.06 | ST-12 | 20 |
| 1H4G | 2.0 | 0.06 | ST-12 | 9.3 |
| 1H5GT | 1.4 | 0.05 | GT | 65 |
| 1H6G | 2.0 | 0.06 | ST-12 | 20 |
| 1LH4 | 1.4 | 0.05 | Lock-in | 65 |
| 2A6 | 2.5 | 0.80 | ST-12 | 100 |
| 6AQ6 | 6.3 | 0.15 | Min. | 70 |
| 6AQ7GT | 6.3 | 0.30 | GT | 70 |
| 6AT6 | 6.3 | 0.30 | Min. | 70 |
| 6AV6 | 6.3 | 0.30 | Min. | 100 |
| 6AW7GT | 6.3 | 0.30 | GT | 80 |
| 6B6G | 6.3 | 0.30 | ST-12 | 100 |
| 6BD7 | 6.3 | 0.23 | T-6½ | 70 |
| 6BF6 | 6.3 | 0.30 | Min. | 16 |
| 6BK6 | 6.3 | 0.30 | Min. | 100 |
| 6BT6 | 6.3 | 0.30 | Min. | 70 |
| 6BU6 | 6.3 | 0.30 | Min. | 16.5 16.0 |
| 6C7 | 6.3 | 0.30 | ST-12 | 20 |
| 6Q7 | 6.3 | 0.30 | Metal | 70 |
| 6Q7G | 6.3 | 0.30 | ST-12 | 70 |
| 6Q7GT | 6.3 | 0.30 | GT | 70 |
| 6R7 | 6.3 | 0.30 | Metal | 16 |
| 6R7GT | 6.3 | 0.30 | GT | 16 |
| 6R8 | 6.3 | 0.45 | T-6½ | 16 |
| 6S8GT | 6.3 | 0.30 | GT | 100 |
| 6SQ7GT | 6.3 | 0.30 | GT | 16 |
| 6SR7/GT | 6.3 | 0.30 | Metal/GT | 16 |
| 6ST7 | 6.3 | 0.15 | Metal | 16 |
| 6SZ7 | 6.3 | 0.15 | Metal | 70 |
| 6T7G | 6.3 | 0.15 | ST-12 | 65 |
| 6T8 | 6.3 | 0.45 | T-6½ | 70 |
| 6V7G | 6.3 | 0.30 | ST-12 | 8.3 |
| 7B6 | 6.3 | 0.30 | Lock-in | 100 |
| 7C6 | 6.3 | 0.15 | Lock-in | 85 |
| 7E6 | 6.3 | 0.30 | Lock-in | 100 |
| 7K7 | 6.3 | 0.30 | Lock-in | 16 |
| 7X7 | 6.3 | 0.30 | Lock-in | 16.5 70 |
| 12AT6 | 12.6 | 0.15 | Min. | 70 |
| 12AV6 | 12.6 | 0.15 | Min. | 100 |
| 12BF6 | 12.6 | 0.15 | Min. | 16 |
| 12BK6 | 12.6 | 0.15 | Min. | 100 |
| 12BT6 | 12.6 | 0.15 | Min. | 70 |
| 12BU6 | 12.6 | 0.15 | Min. | 16.5 16.0 |
| 12Q7GT | 12.6 | 0.15 | GT | 70 |
| 12S8GT | 12.6 | 0.15 | GT | 100 |
| 12SQ7/GT | 12.6 | 0.15 | Metal/GT | 100 |
| 12SR7 | 12.6 | 0.15 | Metal | 16 |
| 12SW7 | 12.6 | 0.15 | Metal | 17 |
| 14B6 | 12.6 | 0.15 | Lock-in | 16 |
| 14E6 | 12.6 | 0.15 | Lock-in | 16 |
| 14X7 | 12.6 | 0.15 | Lock-In | 16.5 85 |
| 19C8 | 18.9 | 0.15 | T-6½ | 100 |
| 19T8 | 18.9 | 0.15 | Min. | 70 |
| 26BK6 | 26.5 | 0.07 | Min. | 100 |

| Type | E _f | I _f | Style | μ |
|-----------|----------------|----------------|-------|----------|
| 26C6 | 26.5 | 0.07 | Min. | 17 16 |
| 55/55S | 2.5 | 1.0 | ST-12 | 8.3 |
| 75 or 75S | 6.3 | 0.30 | ST-12 | 100 |
| 85 | 6.3 | 0.30 | ST-12 | 8.3 |
| 85AS | 6.3 | 0.30 | ST-12 | 20 |

DUO-TRIODES

| Type | E _f | I _f | Style | Gm | μ |
|-----------|----------------|----------------|----------|------|-------|
| 2C21 | 6.3 | 0.60 | ST-12 | 1375 | 10.4 |
| 2C51 | 6.3 | 0.30 | T-6½ | 5500 | 35.0 |
| 2C52 | 12.6 | 0.30 | GT | 1900 | 100.0 |
| 3A5 | 1.4 | 0.22 | Min. | 1800 | 15.0 |
| | 2.8 | 0.11 | | | |
| 3B7 | 2.8 | 0.110 | Lock-in | 1900 | |
| | 1.4 | 0.22 | | | |
| 3C6 | 1.4 | 0.10 | Lock-in | 1300 | |
| | 2.8 | 0.05 | | 1300 | |
| | | | | 1100 | |
| 6AE7GT | 6.3 | 0.50 | GT | 3000 | 14.0 |
| 6AH7GT | 6.3 | 0.30 | GT | 1550 | 16.0 |
| | | | | 1900 | |
| 6BQ7 | 6.3 | 0.40 | T-6½ | 6000 | 35.0 |
| 6C8G | 6.3 | 0.30 | ST-12 | | 36.0 |
| 6F8G | 6.3 | 0.30 | ST-12 | 2600 | 20.0 |
| 6J6 | 6.3 | 0.45 | Min. | 5300 | 38.0 |
| 6N7/GT | 6.3 | 0.80 | Metal/GT | 3100 | 35.0 |
| | | | | 3200 | |
| 6SC7/GT | 6.3 | 0.30 | Metal/GT | 1325 | 70.0 |
| 6SL7GT | 6.3 | 0.30 | GT | 1600 | 70.0 |
| 6SL7WGT | | | | | |
| 6SN7GT | 6.3 | 0.60 | GT | 3000 | 20.0 |
| 6SN7WGT | | | | 2600 | |
| 6SU7GTY | 6.3 | 0.30 | GT | 1600 | 70.0 |
| 7AF7 | 6.3 | 0.30 | Lock-in | 2600 | 17.0 |
| | | | | 1900 | 16.0 |
| | | | | 2100 | |
| 7F7 | 6.3 | 0.30 | Lock-in | 1125 | 70.0 |
| | | | | 1600 | |
| 7F8 | 6.3 | 0.30 | Lock-in | 3300 | |
| 7N7 | 6.3 | 0.60 | Lock-in | 3000 | 20.0 |
| | | | | 2600 | |
| 12AH7GT | 12.6 | 0.15 | GT | 1550 | 16.0 |
| | | | | 1900 | |
| 12AT7 | 6.3 | 0.30 | T-6½ | 4000 | 54.0 |
| | 12.6 | 0.15 | | 6600 | 62.0 |
| | | | | 5500 | 55.0 |
| 12AU7 | 12.6 | 0.15 | T-6½ | 2200 | 17.0 |
| | 6.3 | 0.30 | | 3100 | 19.5 |
| 12AV7 | 12.6 | 0.225 | T-6½ | 6100 | 37.0 |
| | 6.3 | 0.450 | | 8500 | 41.0 |
| 12AX7 | 12.6 | 0.15 | T-6½ | 1250 | 100.0 |
| | 6.3 | 0.30 | | 1600 | |
| 12AY7 | 12.6 | 0.15 | T-6½ | 1750 | 40.0 |
| 12SC7 | 12.6 | 0.15 | Metal | 1325 | 70.0 |
| 12SL7GT | 12.6 | 0.15 | GT | 1600 | 70 |
| 12SN7GT | 12.6 | 0.15 | GT | 3000 | 20 |
| | | | | 2600 | |
| 12SX7GT | 12.6 | 0.30 | GT | 1800 | 21 |
| | | | | 3000 | 20 |
| | | | | 2600 | |
| 14AF7/XXD | 12.6 | 0.15 | Lock-in | 2600 | 17 |
| | | | | 1900 | 16 |
| | | | | 2100 | |
| 14F7 | 12.6 | 0.15 | Lock-in | 1125 | 70 |
| | | | | 1600 | |
| 14N7 | 12.6 | 0.15 | Lock-in | 3000 | 20 |
| | | | | 2600 | |
| 19J6 | 18.9 | 0.15 | Min. | 1900 | 38 |
| 5608-A | 2.5 | 2.0 | ST-14 | 2200 | 16 |
| | | | | 2450 | 17 |
| 5687 | 6.3 | 0.90 | T-6½ | 5200 | 16 |
| | 12.6 | 0.45 | | 8100 | |
| 5691 | 6.3 | 0.6 | GT | 1600 | 70 |
| 5692 | 6.3 | 0.6 | GT | 2200 | 20 |
| 5694 | 6.3 | 0.8 | ST-14 | 3100 | 35 |
| | | | | 3200 | |

RECTIFIERS (GENERAL PURPOSE)

Including Voltage Doublers

| Type | E _f | I _f | Style | Current Output Ma. |
|-------------|----------------|----------------|---------|-----------------------|
| OY4 | | | Metal | 75 |
| OY4G | | | T-7 | 75 |
| OZ4 | | | Metal | 90 |
| OZ4A | | | Metal | 110 |
| OZ4G | | | T-7 | 90 |
| 1V | 6.3 | 0.30 | ST-12 | 45 |
| 2W3GT | 2.5 | 1.50 | GT | 55 |
| 272/G84 | 2.5 | 1.50 | ST-12 | 50 |
| 5AX4GT | 5.0 | 2.25 | GT | 150 |
| 5AZ4 | 5.0 | 2.0 | Lock-in | 125 |
| 5R4GY | 5.0 | 2.0 | ST-16 | 150 |
| | | | | 175 |
| 5T4 | 5.0 | 2.0 | Metal | 225 |
| 5U4G | 5.0 | 3.0 | ST-16 | 225 |
| 5U4WG | 5.0 | 3.0 | T-12 | 225 |
| 5V4G | 5.0 | 2.0 | ST-14 | 175 |
| 5W4 | 5.0 | 1.50 | Metal | 110 |
| 5W4GT | 5.0 | 1.50 | GT | 110 |
| 5X3 | 5.0 | 2.0 | ST-14 | 110 |
| | | | | 30 |
| 5X4G | 5.0 | 3.0 | ST-16 | 225 |
| | | | | 125 |
| 5Y3GT | 5.0 | 2.0 | GT | 125 |
| 5Y4G | 5.0 | 2.0 | ST-14 | 125 |
| 5Z3 | 5.0 | 3.0 | ST-16 | 225 |
| 5Z4 | 5.0 | 2.0 | Metal | 125 |
| 5Z4GT | 5.0 | 2.0 | GT | 125 |
| 6AX4GT | 6.3 | 1.2 | GT | 125 |
| 6AX5GT | 6.3 | 1.2 | GT | 125 |
| 6AX6GT† | 6.3 | 2.5 | ST-14 | 250 |
| 6BY5G† | 6.3 | 1.6 | ST-14 | 175 |
| 6U4GT | 6.3 | 1.2 | GT | 125 |
| 6V3 | 6.3 | 1.75 | T-6½ | 125 |
| 6V4 | 6.3 | 0.60 | T-6½ | 90 |
| 6W4GT | 6.3 | 1.2 | GT | 125 |
| 6X4 | 6.3 | 0.60 | Min. | 70 |
| 6X5 | 6.3 | 0.60 | Metal | 70 |
| 6X5GT | 6.3 | 0.60 | GT | 70 |
| 6X5WGT | 6.3 | 0.60 | GT | 70 |
| 6Y5 | 6.3 | 0.80 | ST-12 | 50 |
| 6Z4 | 6.3 | 0.60 | ST-12 | 60 |
| 6Z5 | 6.3 | 0.80 | | |
| | 12.6 | 0.40 | ST-12 | 60 |
| 6ZY5G | 6.3 | 0.30 | ST-12 | 40 |
| 7X6† | 6.3 | 1.2 | Lock-in | 75 |
| 7Y4 | 6.3 | 0.50 | Lock-in | 70 |
| 7Z4 | 6.3 | 0.90 | Lock-in | 100 |
| 12Z3 | 12.6 | 0.30 | ST-12 | 55 |
| 14Y4 | 12.6 | 0.30 | Lock-in | 70 |
| 25W4GT | 25.0 | 0.30 | GT | 125 |
| 25X6GT† | 25.0 | 0.15 | GT | 60 |
| 25Z4 | 25.0 | 0.30 | Metal | 125 |
| 25Z6† | 25.0 | 0.30 | Metal | 75 |
| 25Z6GT† | 25.0 | 0.30 | GT | 75 |
| 28Z5 | 28.0 | 0.24 | Lock-in | 100 |
| 35W4 | 35.0 | 0.15 | Min. | 60 |
| | | | | 100 |
| 35Y4 | 35.0 | 0.15 | Lock-in | 60 |
| | | | | 100 |
| 35Z3 | 35.0 | 0.15 | Lock-in | 100 |
| 35Z4GT | 35.0 | 0.15 | GT | 100 |
| 35Z5GT | 35.0 | 0.15 | GT | 100 |
| 35Z6G† | 35.0 | 0.30 | ST-14 | 110 |
| 40Z5/45Z5GT | 45.0 | 0.15 | GT | 60 |
| | | | | 100 |
| 45Z3 | 2.5 | 1.50 | ST-14 | 65 |
| 50AX6G† | 50.0 | 0.30 | ST-14 | 250 |
| 50Y6GT† | 50.0 | 0.15 | GT | 75 |
| 50Z6G† | 50.0 | 0.30 | ST-12 | 250 |
| 80 | 5.0 | 2.0 | ST-14 | 125 |
| 81 | 7.5 | 1.25 | ST-16 | 85 |
| 82 | 2.5 | 3.0 | ST-14 | 115 |
| 83 | 5.0 | 3.0 | ST-16 | 225 |

| Type | E _f | I _f | Style | Current Output Ma. |
|-------------|----------------|----------------|-------|-----------------------|
| 83V | 5.0 | 2.0 | ST-14 | 175 |
| 84/6Z4 | 6.3 | 0.50 | ST-12 | 60 |
| 117Z3 | 117.0 | 0.04 | Min. | 90 |
| 117Z4GT | 117.0 | 0.04 | GT | 90 |
| 1005/CK1005 | 6.3 | 0.1 | Metal | 70 |
| 1274 | 6.3 | 0.60 | GT | 70 |
| 1275 | 6.3 | 0.60 | ST-16 | 225 |
| 5517/CK1013 | Cold K | | Min. | 6 |
| 5931 | 5.0 | 3.0 | T-12 | 225 |

† These types may also be used as voltage doublers.

RECTIFIERS (HIGH VOLTAGE TV)

| Type | E _f | I _f | Style | Output Current Ma. |
|--------|----------------|----------------|-------|-----------------------|
| 1B3GT | 1.25 | 0.20 | GT | 2.0 |
| 1V2 | 0.625 | 0.30 | T-6½ | 0.5 |
| 1X2 | 1.25 | 0.20 | T-6½ | 1.0 |
| 1Y2 | 1.5 | 0.29 | Min. | 2.0 |
| 1Z2 | 1.5 | 0.30 | Min. | 2.0 |
| 2V3G | 2.5 | 5.0 | ST-12 | 2.0 |
| 2X2(A) | 2.5 | 1.75 | ST-12 | 7.5 |
| 6Y3G | 6.3 | 0.7 | ST-12 | 7.5 |
| 5642 | 1.25 | 0.20 | T-3 | 0.2 |

RELAY TUBES

Gas Triodes and Tetrodes

| Type | E _f | I _f | Style | Cath. Ma. |
|------|----------------|----------------|-------|-----------------|
| OA4G | Cold K | | ST-12 | 25 |
| OA5 | Cold K | | Min. | 10 Amps Peak |
| | | | | 100 Max. |
| 2A4G | 2.5 | 2.50 | ST-12 | |
| 2C4 | 2.5 | 0.65 | Min. | 5 |
| 2D21 | 6.3 | 0.60 | Min. | 100 Max. |
| 6D4 | 6.3 | 0.25 | Min. | 25 |
| 884 | 6.3 | 0.60 | ST-12 | 300 Peak |
| 885 | 2.5 | 1.50 | ST-12 | 300 Peak |
| 1267 | Cold K | | GT | 25 |
| 2050 | 6.3 | 0.60 | ST-12 | 100 Max. |
| 2051 | 6.3 | 0.60 | ST-12 | 75 Max. |

TV SCANNERS (Horizontal)

| Type | E _f | I _f | Style | Gm |
|---------|----------------|----------------|-------|------|
| 6AR6G | 6.3 | 1.20 | T-11 | 5400 |
| | | | | 4300 |
| 6AU5GT | 6.3 | 1.25 | GT | |
| 6AV5GT | 6.3 | 1.20 | GT | 5500 |
| 6BD5GT | 6.3 | 0.90 | GT | |
| 6BG6G | 6.3 | 0.90 | ST-16 | |
| 6BQ6GT | 6.3 | 1.20 | GT | |
| 6CD6G | 6.3 | 2.50 | ST-16 | 7500 |
| 25AV5GT | 25.0 | 0.30 | GT | 5500 |
| 25BQ6GT | 25.0 | 0.30 | GT | |

TV SCANNERS (Vertical)

| Type | E _f | I _f | Style | Gm |
|--------|----------------|----------------|-------|------|
| 6AQ5 | 6.3 | 0.45 | Min. | 4100 |
| | | | | 3700 |
| 6BF5 | 6.3 | 1.20 | Min. | 4200 |
| 6BL7GT | 6.3 | 1.50 | T-9 | |
| 6K6GT | 6.3 | 0.40 | GT | 1500 |
| | | | | 2300 |

| Type | Ef | If | Style | Gm | Type | Ef | If | Style | μ |
|--------|------|------|---------|------|---------|-----------------|-------|---------|-------|
| 6S4 | 6.3 | 0.60 | T-6½ | 2100 | 14A4 | 12.6 | 0.15 | Lock-in | 20.0 |
| 6SL7GT | 6.3 | 0.30 | GT | 4500 | 26 | 1.5 | 1.05 | ST-14 | 8.3 |
| 6SN7GT | 6.3 | 0.30 | GT | 1600 | 27, 27S | 2.5 | 1.75 | ST-12 | 9.0 |
| | | | | 3000 | 30 | 2.0 | 0.06 | ST-12 | 9.3 |
| 6V6GT | 6.3 | 0.45 | GT | 2600 | 37 | 6.3 | 0.30 | ST-12 | |
| | | | | 3700 | 40 | 5.0 | 0.25 | ST-14 | |
| | | | | 4100 | 56/56S | 2.5 | 1.00 | ST-12 | 13.8 |
| 6Y6G | 6.3 | 1.25 | ST-14 | 3750 | 56AS | 6.3 | 0.40 | ST-12 | |
| | | | | 7000 | 76 | 6.3 | 0.30 | ST-12 | 13.8 |
| | | | | 7100 | V-99 | 3.3 | 0.063 | T-8 | 6.6 |
| 7C5 | 6.3 | 0.45 | Lock-in | 3700 | X-99 | 3.3 | 0.063 | T-9 | 6.6 |
| | | | | 4100 | 485 | 3.0 | 1.25 | ST-12 | 12.5 |
| | | | | 3750 | 864 | 1.1 | 0.25 | T-9 | 8.2 |
| 12BH7 | 12.6 | 0.30 | T-6½ | 6200 | 1230 | Special Type 30 | | | |
| | 6.3 | 0.60 | | 3100 | 9002 | 6.3 | 0.15 | Min. | 25.0 |
| | | | | | XXL | 6.3 | 0.30 | Lock-in | 25.0 |
| | | | | | | | | | 30.0 |

TRIODES (General Purpose)

| Type | Ef | If | Style | μ |
|----------|------|------|----------|-------|
| 1C3 | 1.4 | 0.05 | Min. | 14.5 |
| 1E4G | 1.4 | 0.05 | GT | 14.5 |
| | | | | 14.0 |
| 1G4GT | 1.4 | 0.05 | GT | 8.8 |
| 1LE3 | 1.4 | 0.05 | Lock-in | 14.5 |
| | | | | 14.0 |
| 2C22 | 6.3 | 0.3 | T-9 | 20.0 |
| 6AD5G/GT | 6.3 | 0.30 | ST-12/GT | 100.0 |
| 6AE5GT | 6.3 | 0.30 | GT | 4.2 |
| 6AF5G | 6.3 | 0.30 | ST-12 | 7.4 |
| 6C4 | 6.3 | 0.15 | Min. | 17.0 |
| | | | | 19.5 |
| 6C5/GT | 6.3 | 0.30 | Metal/GT | 20.0 |
| 6F5/GT | 6.3 | 0.30 | Metal/GT | 100.0 |
| 6J4 | 6.3 | 0.40 | Min. | 55.0 |
| 6J5/GT | 6.3 | 0.30 | Metal/GT | 20.0 |
| 6K5G/GT | 6.3 | 0.30 | ST-12/GT | 70.0 |
| 6L5G | 6.3 | 0.15 | ST-12 | 15.0 |
| | | | | 17.0 |
| 6N4 | 6.3 | 0.20 | Min. | 32.0 |
| 6P5 | 6.3 | 0.30 | GT | 13.8 |
| 6Q4 | 6.3 | 0.48 | T-6½ | 80.0 |
| 6SF5/GT | 6.3 | 0.30 | Metal/GT | 100.0 |
| 7A4 | 6.3 | 0.30 | Lock-in | 20.0 |
| 7B4 | 6.3 | 0.30 | Lock-in | 100.0 |
| 12A | 5.0 | 0.25 | ST-14 | 8.5 |
| 12A4 | 6.3 | 0.60 | T-6½ | 20.0 |
| | 12.6 | 0.30 | | |
| 12E5GT | 12.6 | 0.15 | GT | 13.8 |
| 12F5GT | 12.6 | 0.15 | GT | 100.0 |
| 12J5GT | 12.6 | 0.15 | GT | 20.0 |
| 12SF5/GT | 12.6 | 0.15 | Metal/GT | 100.0 |

TRIODES H.F. - OSCILLATORS H.F. Single Triodes - Duo Triodes

| Type | Ef | If | Style | Gm |
|-----------|------|-------|---------|-------|
| 3A5 | 1.4 | 0.22 | Min. | 1800 |
| | | | | |
| 6AB4 | 2.8 | 0.11 | Min. | 5500 |
| 6AF4 | 6.3 | 0.15 | Min. | 6600 |
| 6AK4 | 6.3 | 0.225 | Min. | 6600 |
| 6BK7 | 6.3 | 0.150 | Submin. | 3800 |
| | | | T-6½ | 6100 |
| | | | | 8500 |
| 6BQ7 | 6.3 | 0.40 | T-6½ | 6000 |
| 6C4 | 6.3 | 0.15 | Min. | 2200 |
| | | | | 3100 |
| 6F4 | 6.3 | 0.225 | Acorn | 5800 |
| 6J4 | 6.3 | 0.40 | Min. | 12000 |
| 6J6 | 6.3 | 0.45 | Min. | 5300 |
| 6L4 | 6.3 | 0.225 | Acorn | 6400 |
| 6R4 | 6.3 | 0.20 | T-6½ | 5500 |
| 7A4 | 6.3 | 0.30 | Lock-in | 3000 |
| | | | | 2600 |
| 7E5 | 6.3 | 0.15 | Lock-in | 3000 |
| 7F8, 7F8W | 6.3 | 0.30 | Lock-in | 5200 |
| 12AT7 | 6.3 | 0.30 | T-6½ | 4000 |
| | 12.6 | 0.15 | | 6600 |
| | | | | 5500 |
| 14F8 | 6.3 | 0.30 | Lock-in | 5200 |
| 19J6 | 18.9 | 0.15 | Min. | 1900 |
| 1293 | 1.4 | 0.11 | Lock-in | 1500 |
| 1626 | 12.6 | 0.25 | ST-12 | |

EXPLANATION OF TRANSMISSION LINE TRANSFORMER

The article "A High Performance Booster for FM Reception" in the April SYLVANIA NEWS contained a schematic showing a balanced to unbalanced transmission line transformer. We have received several inquiries concerning the operation of this circuit.

The bifilar windings approximate two 150-ohm quarter-wave transmission lines at fm frequencies which are connected in series to match 300 ohms at one end and parallel to match 75 ohms at the other as shown

in Figure 1. The center of the balanced end can either be grounded or ungrounded. If it is grounded the balance will be more symmetrical with respect to ground. The fact that one of the coils is grounded at both ends makes the circuit appear odd schematically but does not affect its operation as a simulated transmission line. This circuit can be used in many other applications where matching from a 300-ohm balanced to 75-ohm unbalanced line is desired.

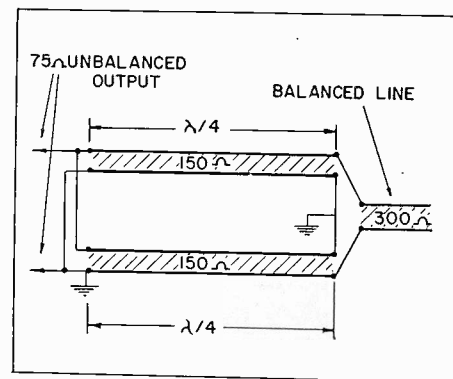


Figure 1.
Balanced to Unbalanced Transformer.

MAXIMUM ACCURACY FROM THE POLYMER (Continued from page 5)

current drawn from them is very small. However, the batteries will eventually be used up and need to be replaced with fresh cells. The 1.5 volt cells should be changed when the measurement of a small known resistance, such as 10 ohms, is not correct.

The r f probe should have been

calibrated to the instrument with which it is used. If it is desired to have the probe repaired or calibrated it will be necessary to return the instrument with the probe to your nearest Sylvania Service Station, unless you have the calibration equipment described in the Operating Manual.

LIMITATIONS

There are very few limitations to the use of the Polymer within the specifications of Table I. The input resistance is high enough to have negligible loading effect on any circuit encountered by the serviceman. In audio voltage measurements some circuits may be affected by the 45 $\mu\mu\text{f}$ capacity of the shielded a c lead. The use of an unshielded lead will eliminate this capacity.

When measuring small r f voltages superimposed on a d c voltage exceeding 500 volts, a series blocking capacitor should be added in series with the probe. Note that the probe is designed for high frequencies; it has considerable error at frequencies less than 10,000 c p s. The extension tip supplied with the probe can be used up to 30 mc. The extension will cause error above this frequency because of its inductance.*

TABLE 1

| D C VOLTAGES | | OHMS PER VOLT | ACCURACY |
|---|----------------------------|---|---------------------------|
| 0-3 | | 5,333,333 | } $\pm 3\%$ of full scale |
| 0-10 | | 1,600,000 | |
| 0-30 | | 533,333 | |
| 0-100 | | 160,000 | |
| 0-300 | | 53,333 | |
| 0-1000 | | 16,000 | |
| A C VOLTAGES: Audio (capacity 40 $\mu\mu\text{f}$ at terminals) | | | |
| 0-3 | | 900,000 | } $\pm 7\%$ of full scale |
| 0-10 | | 270,000 | |
| 0-30 | | 90,000 | |
| 0-100 | | 27,000 | } $\pm 9\%$ of full scale |
| 0-300 | | 9,000 | |
| 0-1000 | | 2,700 | |
| Frequency Range of 20 c p s to 15,000 c p s | | | |
| A C VOLTAGES: RF at frequencies up to 300 mc with probe capacity of 3 $\mu\mu\text{f}$ (See Note 1) | | | |
| CURRENT | | RESISTANCE | |
| 0-10 | amps | .015 ohms | } $\pm 5\%$ of full scale |
| 0-1000 | ma | .150 ohms | |
| 0-300 | ma | .50 ohms | } $\pm 3\%$ of full scale |
| 0-100 | ma | 1.5 ohms | |
| 0-30 | ma | 5.0 ohms | |
| 0-10 | ma | 15.0 ohms | |
| 0-3 | ma | 50.0 ohms | |
| RESISTANCE | CURRENT REQUIRED | | |
| 0-1000 ohms | 300 ma @ 0 ohms | } $\pm 10\%$ to left of $\frac{1}{2}$ scale | |
| 0-10,000 ohms | 30 ma @ 0 ohms | | |
| 0-100,000 ohms | 3 ma @ 0 ohms | | |
| 0-1 meg. | 0.3 ma @ 0 ohms | | |
| 0-10 meg. | 30 μa @ 0 ohms | | |
| 0-1000 meg. | 0.3 μa @ 0 ohms | | |

SYLVANIA SERVICE

If you have followed all the instructions carefully and your Polymer is still inaccurate, return your instrument to the nearest Sylvania Service Station for a check-up.

Additional Operating Manuals may be obtained by sending \$1.00 to the Advertising Department of Sylvania Electric Products Inc., Emporium, Pennsylvania.

NOTE 1: The R F Probe uses a specially developed Sylvania sub-miniature high frequency diode which allows the user to measure r f voltages up to 500 mc on full scale ranges of 3, 10, 30, 100 and 300 volts. Response is unusually flat up to 300 megacycles. Accuracy is 7% on the 3 volt and 10 volt scales up to 100 mc where the input resistance of the diode tube and the shunt capacity inherent in wired circuits begins to become important. The low impedance circuits normally encountered at very high frequencies allow the probe to be used with minor effects on the circuit under test.

*For precautions on using the Polymer probe at radio frequencies see SYLVANIA NEWS, Vol. 15, No. 9, October, 1948.



MERCHANDISING SECTION

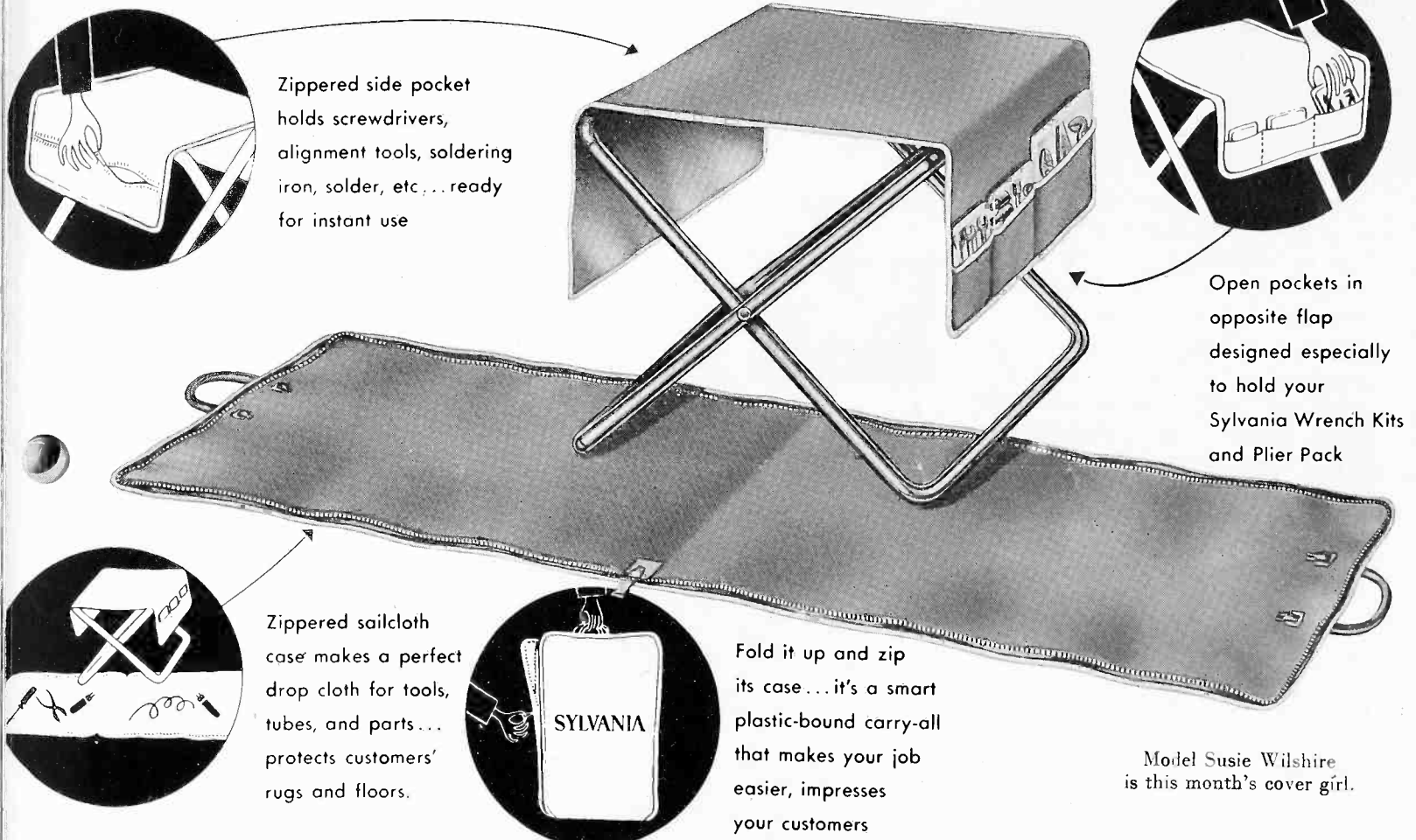
JUNE - JULY, 1952

Vol. 19, No. 6

THE SYLVANIA SIT-N-FIXIT

FREE....WITH YOUR PURCHASES OF SYLVANIA TUBES

only 16 Sylvania premium tokens for the handiest servicing aid you ever owned



Zippered side pocket holds screwdrivers, alignment tools, soldering iron, solder, etc... ready for instant use

Open pockets in opposite flap designed especially to hold your Sylvania Wrench Kits and Plier Pack

Zippered sailcloth case makes a perfect drop cloth for tools, tubes, and parts... protects customers' rugs and floors.

Fold it up and zip its case... it's a smart plastic-bound carry-all that makes your job easier, impresses your customers

Model Susie Wilshire is this month's cover girl.

From July 1st to August 31st your Sylvania Distributor will give you a Sylvania Sit-N-Fixit . . . free . . . in exchange for 16 Sylvania Premium Tokens. How do you accumulate the tokens? Here's how: you get one Sylvania Premium Token free with every Sylvania Picture Tube or every 25 Sylvania Receiving Tubes you buy. When you have 16 Sylvania Premium Tokens you trade them to your Sylvania Distributor for your free Sit-N-Fixit, the most amazing servicing aid you ever used. The Sylvania Sit-N-Fixit will make

your home service calls easier, faster, more comfortable. It consists of two parts. First, there is a smart, plastic-bound, carry-all, zippered case that makes a perfect drop cloth for tools, tubes, and parts. This case will protect your customers' rugs and floors. Second, the stool itself, made of folding aluminum and a water repellent sailcloth, makes it ideal for the beach or a camping trip.

On one side of the stool is a zippered side pocket that holds screwdrivers, alignment tools, soldering iron, solder, and other tools you may

need ready for instant use. On the opposite side of the Sit-N-Fixit there is a flap designed especially to hold your Sylvania Wrench Kits and Plier Pack.

Don't delay. Start saving Sylvania Premium Tokens today. Remember your Sylvania Distributor can make this great free offer only during July and August. Sylvania Premium Tokens will not be redeemed for Sit - N - Fixits by Sylvania Electric Products, Inc., Emporium, Pa., but ONLY by Authorized Sylvania Tube Distributors.

BIG AND EFFICIENT— THAT'S DYNAMIC'S TV SERVICE DEPARTMENT

Talk about a dream TV Service Department. Dynamic - Electronics - New York, Inc. really has one. Operated for over two decades, it has been in its present quarters at 73-39 Woodhaven Boulevard, Glendale, Long Island, New York since October, 1950. Capable William R. Brenner is its manager.

Dynamic's Service Department employs 65 outside servicemen and 24 installation men who operate company cars and eleven trucks. A six-man field supervising unit provides special technical or business help to servicemen and checks on their efficiency. This group also takes care of chronic complaints.

Fifteen inside servicemen are employed to service TV sets that have been "pulled" from customers' homes. Each of these men has his own set of test equipment—polymer, oscilloscope, sweep generator, marker generator. The test equipment is almost 100 per cent Sylvania. The servicemen work in an area with plenty of elbow room—75 by 130 feet. There are sections for incoming and finished sets as well as convenient tables for stacking. All sets are tagged by cards which have a different color for each month.

A cabinet finishing department which is especially helpful in doing conversion work is also on the premises. Seven are employed here; three are master cabinet makers.

For all this activity one expects to find a huge stock room. Dynamic has one in which five men work. Two of this group work on nothing but inventory control. Dynamic uses more Sylvania Radio and Picture Tubes than any other brand.

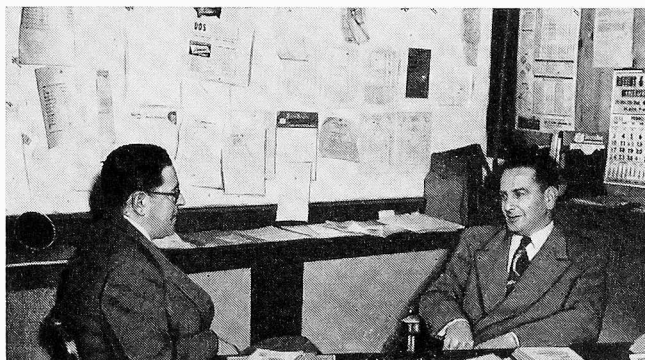
At present, 75 per cent of the radio and television sets serviced are ones originally sold in Dynamic's retail stores. The remainder comes from set owners who have heard of the efficiency and resources of this service

department from their friends or from the advertising campaign that Dynamic has recently begun in New York City newspapers. Servicing has previously been advertised in Dynamic's newspaper ads for sale of radio and TV sets.

Fifty-five per cent of Dynamic's

service business is currently on a contract basis, but service on per-call basis is steadily rising.

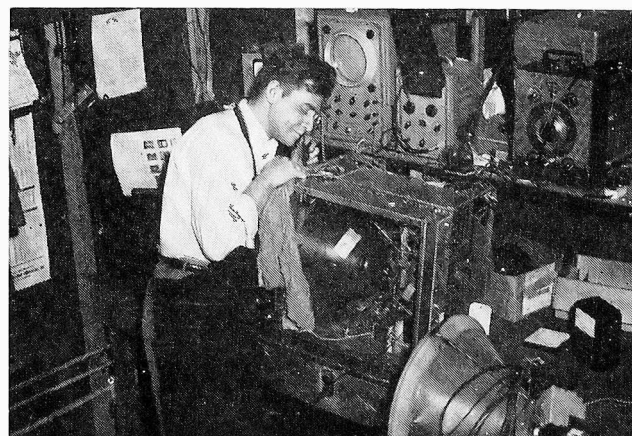
Dynamic's service business is big and successful. Its operating techniques, however, can be studied with profit by many a smaller service organization.



William Brenner (right), manager of Dynamic's service department and Bob McNelis, Sylvania District Manager of Greater New York City Renewal Tube Sales, talk shop.



Here is a partial view of Dynamic's huge service layout.



Sam Sackowitz, Dynamic television service technician, is shown at left working on a set. It's easy to see that Sylvania test equipment is the principal brand used at Dynamic.

NEW, HELPFUL BOOK AVAILABLE AT SYLVANIA DISTRIBUTORS

A Primer of Electronics and Radiant Energy is a new book by Sylvania Sales Engineer Don Caverly. It has been written to help the new radio and TV serviceman as well as the old timer. In an effort to learn quickly, the trainee often finds it necessary to skip through some of the basic and fundamental principles underlying the operation of radio—the physics of what happens and why. Here they are in simple, easily understood language.

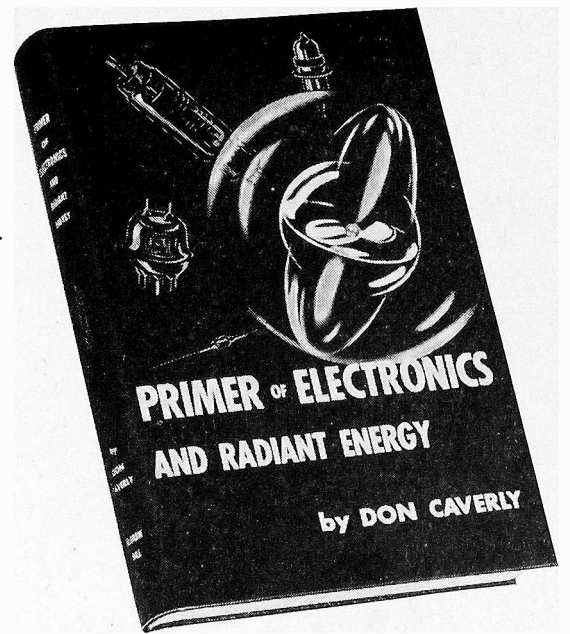
Here is bedrock information on electricity, magnetism, electromagnetic waves as well as data on the most important types of electron tubes and equipment used in radio, television, radar, loran, sonar and many industrial processes. The new serviceman, or the man planning to become one will gain from the *Primer* a good foundation for his more advanced and detailed study.

For the established serviceman who knows all the tricks of his trade, the book offers a chance for him to

broaden the scope of his understanding of the basic principles of electronics, quickly and easily. It gives him a glimpse of atomic energy and nuclear physics fundamentals without wasting his time on subject matter he will never be able to use in his work. For the old timer, too, a refresher course covering the present-day concepts of electricity and magnetism will be valuable.

The average retail salesman of radio and television equipment usually wants to know more about the products he sells, but is unable to gain such knowledge because he frequently lacks the technical training necessary to understand books on the subject. The *Primer* is for him, too, since all the complex technical aspects and mathematics have been deliberately avoided so he can read it almost as easily as a novel.

The book's 340 pages contain over 200 pictures, drawings and diagrams, and the four-color frontispiece is a chart of the complete range of radiant



energy, from long wave radio to cosmic radiation, with all of the regions and their uses indicated at the correct frequency and wavelength.

A Primer of Electronics and Radiant Energy is available at your Sylvania Distributor. Because of this book's importance to the service dealer, he is selling the volume at \$4.50—a dollar under the list price of \$5.50 at which it is being sold at all leading book stores.

Everyone Will See and Remember The New Sylvania Outdoor Dealer Sign



Many service dealers have asked Sylvania to produce a really big out-

door dealer sign. Well, Sylvania has—and a more powerful advertiser and sales booster you've never before seen.

This sign—3 feet by 4 feet—is illuminated by 10 incandescent lamps and shines brightly in three colors. It is made of genuine lucite plastic and held together with rustproof steel fillers.

Best of all, your name goes in the imprint space—the dominant section of the sign. A space 1½ feet by 3 feet will tell anyone walking by your shop or driving by—fast—who you are and what you do. The memory that this sign leaves will bring new customers into your shop and build

you impressive new profits.

It practically shouts to your prospects that you are a service dealer who uses the best, high quality materials to repair radio and television sets. It tells everyone that you are a Sylvania Tube Dealer. That will mean plenty to all the set owners in your town, who have read about your service and Sylvania quality in *Life*, *Saturday Evening Post*, *Collier's*, and *Better Homes & Gardens* or heard about you and the fine Sylvania Tubes you use on Sylvania's television show, *Beat the Clock*.

Now this terrific Sylvania Outdoor Dealer Sign is yours at Sylvania's cost price of \$144. Ask your Sylvania Distributor about this great sales-building sign. He will give you complete details on how you can obtain your own personalized outdoor sign.

SCAN EDUCATES AND ENTERTAINS YOUR CUSTOMERS



Radio and television service dealers have long expressed their appreciation of Sylvania's program to acquaint the public with the real value of America's service industry. They are anxious that their customers should know the requirements in skill, training, and investment that a service dealer must have to do a good job.

A new pocket-sized magazine de-

signed to be distributed to the TV set owner by service companies should be of interest to every dealer. Produced by Parks Publishing Company, this monthly magazine is entitled *Scan*. It contains material which aims to bring to the set owner the story of TV servicing in a delightful and interesting manner. Replete with eye-catching pictures, *Scan's* editorial material is divided between pure entertainment and information on the complexities of TV servicing. The table of contents of the first issue of *Scan* indicates its good balance. Articles in italics are those that carry servicing's message to the consumer.

Critic of the Month—\$75,000 an Hour, is it Worth it? *Does TV Service Cost Too Much?* *Are you sure you know what a Parts Warranty is?* Quotes. *All Clear on TV Front.* Skelton. *Don't Touch that Set!* Who's That Knocking on my Door? *Daddy Where does the Picture come from?* *Quick Facts about Your TV Set.*

For Ladies Only. *Scan Salutes I Remember Mama.*

Because *Scan* is imprinted with the individual service dealer's company name, it acts as a personal house organ to his customers.

Scan is available to service companies on a no-minimum-quantity basis. Prices are: 1 to 500 copies—10 cents each; 500 to 1,000 copies—7½ cents each; 1,000 to 2,500 copies—5 cents each; 2,500 to 5,000 copies—4½ cents each; over 5,000 copies—4 cents each. For further details write to Mal Parks, Parks Publishing Co., 679 Michigan Avenue, Chicago 11, Ill.

ADVERTISING DEPT. MOVES TO BUFFALO

The advertising production departments of all of Sylvania's divisions have been consolidated. This newly formed department, managed by H. G. Kronenwetter, is now located at 1100 Main Street, Buffalo 9, N. Y.

All Sylvania dealers and distributors will want to direct all future orders and correspondence to the new address.

The new location of the advertising production department as well as its expanded facilities will give dealers and distributors the best possible service.

SYLVANIA NEWS

SYLVANIA ELECTRIC PRODUCTS INC.
P. O. BOX 431
EMPORIUM, PENNSYLVANIA

Sec. 34.66 P. L. & R.
U. S. POSTAGE
PAID
Permit No. 1
Emporium, Pa.

For
J. A. Renville
163 Main St.
Luzerne, Pa.

Form 3547 Requested

Vol. 19, No. 6

JUNE-JULY 1952

PUBLISHED BY
SYLVANIA ELECTRIC PRODUCTS INC.

MANUFACTURERS OF SYLVANIA RADIO TUBES, CATHODE RAY TUBES, ELECTRONIC DEVICES, FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, ELECTRIC LIGHT BULBS, PHOTOLAMPS, RADIO AND TELEVISION RECEIVERS.

In This Issue

NEWS

PIONEER BROADCASTERS
HONORED BY SYLVANIA
BILLIONTH TUBE AWARDS

MERCHANDISING

THE SYLVANIA SIT-N-FIXIT
FREE

TECHNICAL

MAXIMUM ACCURACY
FROM THE POLYMER

All orders and correspondence should be sent to
press Emporium, Pa. address until August 1st.
After that date to address shown above.

SYLVANIA NEWS

OCTOBER 1952

FREE CHRISTMAS GIFTS FOR
SERVICE DEALERS. READ ABOUT
THIS SENSATIONAL PROMOTION
ON PAGE 9.



C. J. Lutens, editor
copyright 1952
Sylvania Electric Products Inc.
Vol. 19, No. 8



REPLACING WORN OUT PICTURE TUBES --- A COMPLEX PROBLEM FOR SERVICE INDUSTRY

By Harold H. Rainier



The rapid development of this great television industry, of course, creates many problems. There are as many varied conditions to meet in the maintenance of television as there are in the broadcasting and in the production and sale of receivers.

One of the most complex and knotty problems in this still "just a borning" industry, is the matter of replacing defective or worn out picture tubes. This subject poses a problem for the service dealer, and particularly to those specializing in installation and TV set contract maintenance. A new picture tube while declining in cost still is sold at a comparatively high price. As an example, when a dealer is forced to make a free replacement of a defective tube under warranty or sells a new tube to replace one that has expired, the cold matter of dollars and cents at least suggests the possibility of using something cheaper. The dealer obviously can make a greater immediate saving by supplying a lower priced tube. On the other hand, he

can install a picture tube made and guaranteed by a manufacturer with an accepted name. What to do! Nobody has all the answers to these industry problems, but we think the decision must be governed by the dealer's long term plans and policy.

It is pretty generally acknowledged that you must carefully consider the people you hope to keep as permanent customers. Probably nearly every service dealer can remember occasions when he has turned down immediate business realizing that the quick profit could mean a long term loss. We think that is the answer to this dilemma which confronts so many service and installation companies in this fast growing business.

Now we believe, in all fairness, that we should not give any impression of making a blanket criticism of companies who manufacture rebuilt tubes. This is America, and under the free enterprise system it is just as legitimate to manufacture rebuilt tubes as to manufacture new tubes. We do believe there is a great variance in the quality of tubes rebuilt by the many and varied companies in this field. We know there are many rebuilt tubes sold still bearing the name of the original manufacturer. Other companies apparently are conscientious and try to give care to the rebuilding process. There is considerable feeling in the industry, however, that rebuilt tubes should be marked so the purchaser knows whether he is receiving a new or rebuilt tube.

It has recently been popular for writers seeking a subject to make a "whipping boy" out of the service industry. Granted not every person in the service business is honest or efficient. Neither are they in any

other business—including writers. To hit the service business is very easy, however, and good fun because it is very difficult for the service dealer to effectively strike back.

Sylvania, like other component manufacturers, has been very deeply disturbed by these attacks. We resent them because they are destructive and unfair. We also have a selfish yet very legitimate reason for resenting such tactics. We feel that what unfairly hurts our dealers also unfairly hurts us and our distributors. We resolved to hit directly at such attacks. We have already done this through our television program, by survey reports, by magazine articles, by direct mail, and by other means. We hope that other manufacturers will take similar protective measures. If the true facts are known, these vicious attacks will gradually cease. No matter what is done in this regard, however, such stigma is hard to completely refute. It is like the reply to an accusing headline—the correction too often appears as a small paragraph at the bottom of page 19.

We mention this situation, because we believe in these formative days of television maintenance that it is vital that everything possible be done to inspire public confidence. What stronger foundation can be had than numerous satisfied customers? To build a clientele of satisfied customers, of course, the most efficient service must be rendered. Certainly the use of nationally accepted quality products backed by advertising, research, and long experienced manufacturing must be a part of any strong building for the future program. We believe it is the logical answer to the perplexing service problem we have discussed here.

Calamaras Pays Tribute To Independent Servicemen

A group of 300 persons recently attended a civic and industry planned meeting in Washington, D. C., sponsored by Leslie C. Rucker, Rucker Radio Wholesalers, Washington.

Present were retailers, television servicemen, representatives of the national and local Better Business Bureau, and officials from the Office of the Electrical Engineers of the District of Columbia.

The session was prompted by the action of certain individuals in the District who have complained to public officials that servicemen have been unfair to TV owners, and who are now recommending that the District enact a licensing law for TV servicemen.

Speakers for the evening were Louis B. Calamaras, executive vice president of the National Electronic Distributors Association; John F. Rider, John F. Rider Publisher, Inc.; and Frank W. Mansfield, director of market research for Sylvania Electric.

Calamaras, in his review of television and TV service, presented the underlying reasons for public displeasure in the early stages of television and the wave of criticism

against television servicemen. Calamaras stressed the gross injustice of these accusations, especially since all in the industry knew that the independent serviceman did accomplish miracles in the installation and servicing of television sets.

Even in 1946 television manufacturers, Calamaras stated, would have preferred to withhold the production and public sale of sets for a few more years to enable themselves to properly train men to install and service sets and to eliminate all kinks in the sets. Despite these handicaps and deterring factors, the public and even men at government level, more or less pressed the industry to make television available to the public.

In the face of this confusion, the industry did produce, sell, and make available to the using public this mysterious, complicated mechanism; and as soon as trouble began with television sets, those furthest removed from responsibility (the independent servicemen) had to carry all of the responsibility and blame.

Calamaras described the problems which faced industry and particularly servicemen through 1948 and



up to the present. He explained that complaints against servicemen have now been reduced to a low level.

"Of one thing I am certain," said Calamaras. "That is that if the newspapers and magazines which have carried unfair, prejudiced and distorted stories would make the effort to learn the truth about the industry and give the proper picture to the American public, this wave of criticism would cease within 24 hours.

"I therefore strongly urge the representatives of the press as a public service to make some effort toward learning the truth about this situation, and pass it on to the American public."

NEW MEMBERS OF SYLVANIA'S TRUCKLOAD OF PICTURE TUBES CLUB

Three more Sylvania Distributors are stocking fast-moving Sylvania Picture Tubes by the truckload to accommodate their dealer customers in the very best manner.

Bottom right there's a truckload for Dymac Inc., Buffalo, N. Y.; left to right in the picture are: Justin McCarthy, Sylvania; Wally Hahn and Wally Young, Brewster Television Service; Richard Dybowski, Dymac; Richard Rapp of Oliver Rapp; Ray Clements, Dymac; John Vail, Sylvania; the Sylvania truck driver; and Charles Royce, Phil Burns, A. J. Dybowski, and Francis St. Denis, Dymac.

Top right J. V. Duncombe is delivering a Sylvania Picture Tube direct to serviceman William V. Quinn. Sylvania's John Vail (at far left) and Justin McCarthy look on.

Below another new member—Rucker Radio Wholesalers. Left to right: R. E. Anderson, C. Carter of Rucker; W. J. Hopkins, Sylvania; J. M. Saunders, Lisby Rucker, A. P. Minnigh of Rucker; George C. Isham, Sylvania; E. M. Gardner and C. W. Davis, Rucker.



NEW TV PICTURE TUBE COMPARISON CHART

Your Sylvania Distributor has the new Television Picture Tube Comparison Chart now. And it's yours—free for the asking. Designed specifically for wall use at the work area in service shops, this handsome chart is a convenient 17 by 22 inches.

Concise arranged, the new TV Picture Tube Comparison Chart lists only the basic picture tube characteristics most needed by the television technician who desires a quick, easy-to-follow guide. The chart is substantially complete as to tube types listed.


Don't pass up this great free offer. See your Sylvania Distributor today.

TV Service Goes On C.O.D. Basis

There have been many changes, some good and some bad, in the TV servicing picture since publication in July 1950 of the *Electronics Magazine* survey: Why Television Receivers Fail in Service. These changes are important, because TV servicing is rapidly approaching a billion-dollar-a-year business that may overshadow even new-receiver sales figures.

On the credit side, manufacturers are making more reliable sets and the public is becoming more tolerant of minor defects in pictures, with the result that paying calls have dropped to an average of 3.5 per year as compared to 5.5 for 1950. At an average of \$12.50 per call including parts and with an estimated average of 17.5 million sets in use in 1952, this means that a minimum of three-quarters of a billion dollars will be spent this year on repairs.

Less than 5 per cent of the TV sets in use are under service contracts



TV PICTURE TUBE COMPARISON CHART

| SYLVANIA | | | | | | | | | | TV PICTURE TUBE COMPARISON CHART | | | | | | | | | |
|----------|------|---------------|---------------|-----------------------|------------|------------|------------|-------------|--------|-------------------------------------|---------------|---------------|-----------------------|------------|------------|------------|-------------|--|--|
| TYPE | FACE | BODY | | | FOCUS | | DEFLECTION | MAX. LENGTH | TYPE | FACE | BODY | | | FOCUS | | DEFLECTION | MAX. LENGTH | | |
| | | Clear Frontal | Round or Flat | External Grid Coating | Min. Angle | Max. Angle | | | | | Clear Frontal | Round or Flat | External Grid Coating | Min. Angle | Max. Angle | | | | |
| 20P4 | C | Round | Y | No | EA | EA | 54 | 1410 | 100P9 | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4A | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9A | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4B | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9B | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4C | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9C | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4D | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9D | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4E | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9E | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4F | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9F | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4G | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9G | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4H | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9H | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4I | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9I | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4J | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9J | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4K | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9K | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4L | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9L | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4M | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9M | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4N | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9N | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4O | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9O | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4P | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9P | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4Q | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9Q | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4R | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9R | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4S | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9S | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4T | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9T | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4U | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9U | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4V | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9V | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4W | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9W | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4X | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9X | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4Y | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9Y | I | Round | G | No | EA | EA | 54 | 1410 | | |
| 20P4Z | I | Round | Y | No | EA | EA | 54 | 1410 | 100P9Z | I | Round | G | No | EA | EA | 54 | 1410 | | |

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TECHNICAL SECTION

OCTOBER 1952

Vol. 19, No. 8

William O. Hamlin, Technical Editor

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A NEW TELEVISION IF INTERFERENCE

By W. O. Hamlin - Technical Editor

Recently the radio amateurs were authorized to use their 15 meter band which covers the frequencies from 21 to 21.45 mc. The signals on these frequencies may be received by some of the television sets that have if's tuned to them within the RTMA sound standard of 21.25 to 21.9 mc.

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It should be pointed out that this is a case of interference where the difficulty is 100% at the receiver, since the problem is one of fundamental frequency reception. It is possible that a signal could be received from thousands of miles away by short wave skip if the tv receiver did not have sufficient isolation between the if strip and antenna. Fortunately, many receivers of recent vintage are using 44 mc if's², and the 21.25 mc if receivers can easily be cured of this trouble.

Two methods may be used. The first method is to prevent the short wave signal from entering the set by installing a high pass filter in the transmission line at the point of connection to the receiver. A high pass filter will pass all signals above a certain frequency, (which is around 50 mc in one well-known make) and attenuate all signals below this frequency (See Figure 1)³. This type of filter is available for either 300 ohm or coaxial lines. It will be quite effective for eliminating not only 21 mc amateur signals, but all short wave signals, if installed at the antenna terminals of the receiver and grounded to the chassis. If a booster is used, be sure to place the filter at the terminals of the set, since the line between the set and booster can also pick up signals.

A second method, that may be better where a very strong interfering signal is received, is to realign the if stages of the tv receiver to frequencies above 21.45 mc. The best frequencies would be 21.7 or 21.9 mc, if there is no loss of gain or change in the waveform (See Figure 2). To do this job you must have a sweep frequency generator such as the Sylvania Type 500 sweep generator, an oscilloscope (Sylvania Type 132 or 400), and a marker generator

(Sylvania Type 501) or an accurately calibrated signal generator.

The procedure will vary slightly between sets with a separate sound if channel and those with inter-carrier sound. The 4.5 mc inter-carrier sound stages will not have to be retuned. The first step is to connect the signal and marker generators to the front of the if strip and the 'scope to the video detector, as recommended in the manufacturer's instruction manual. Set the sweep width of the generator to 10 mc and the center frequency to the if frequency as given by the set manufacturer, which would be about 23.25 mc for a 21.25 mc sound carrier. Now adjust the signal generator's rf attenuator and the gain on the 'scope for a convenient size 'scope pattern. These gain settings are to be used as a reference point to detect any change in amplification due to realignment; so, make a note of the settings and 'scope pattern amplitude. To realign the sound to 21.7 mc follow the manufacturer's instructions for if alignment adding .45 mc to each if frequency given. Follow the waveforms for the particular set you are working on and use the marker generator to help you do the alignment job accurately stage

(Continued on page 6)

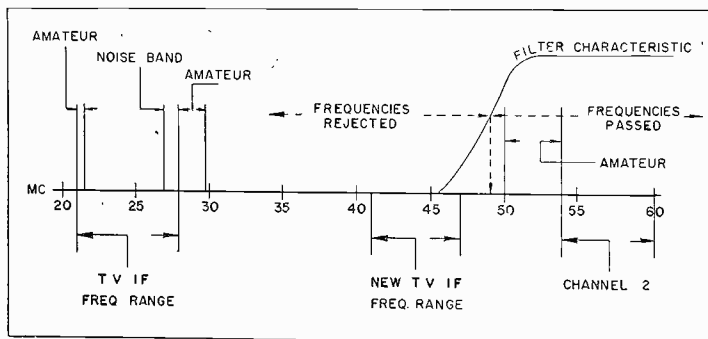


Figure 1. Characteristics of a typical high-pass filter.

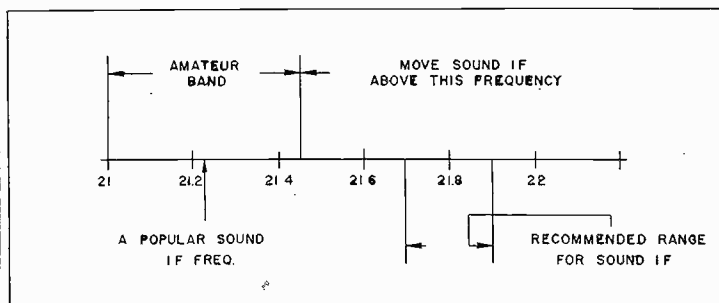


Figure 2. Frequency spectrum of the 21 MC region.

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Binders With Complete File of Technical Sections:

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Less than 5 per cent of the TV sets in use are under service contracts

SYLVANIA TV PICTURE TUBE COMPARISON CHART

| TYPE | FACE Clear Front Aperture | BODY | | | | FOCUS DEFLECTION | | MAX LENGTH | | TYPE | FACE Clear Front Aperture | BODY | | | | FOCUS DEFLECTION | | MAX LENGTH | | | | | | | | | | | |
|-------|------------------------------------|----------------|-------------------------------|----------------|-------------------------------|-------------------------|---------------------|------------|--|-------|------------------------------------|----------------|-------------------------------|-------------------------|---------------------|------------------|-----|------------|--|-------|---|--------|-----|-----|-----|---|-----|--------|--|
| | | Shield Type | Internal Shield Coating | Shield Type | Internal Shield Coating | Focal Len. Inches | Deflection Angle | | | | | Shield Type | Internal Shield Coating | Focal Len. Inches | Deflection Angle | | | | | | | | | | | | | | |
| 300P1 | 1 | Shield | Yes | Yes | Yes | 5 | 15° | 17 1/2 | | 300P1 | 1 | Shield | Yes | Yes | Yes | 5 | 15° | 17 1/2 | | 300P1 | 1 | Shield | Yes | Yes | Yes | 5 | 15° | 17 1/2 | |

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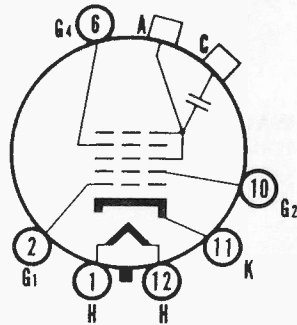
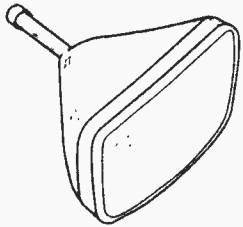
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A NEW TELEVISION

Sylvania Type 17LP4/17VP4

TELEVISION PICTURE TUBE

- | | |
|-----------------------|---------------------------------|
| 17" Direct Viewed | Rectangular Glass Type |
| Cylindrical Faceplate | Gray Filter Glass |
| Magnetic Deflection | Low Voltage Electrostatic Focus |
| Single Field Ion Trap | External Conductive Coating |



12-1

CHARACTERISTICS

General Data

| | |
|-------------------------------|-------------------|
| Focusing Method | Electrostatic |
| Deflecting Method | Magnetic |
| Deflecting Angle (approx.) | |
| Horizontal | 65 Degrees |
| Diagonal | 70 Degrees |
| Phosphor | P4 |
| Fluorescence | White |
| Persistence | Medium |
| Faceplate | Gray Filter Glass |
| Light Transmittance (approx.) | 72 Percent |

Electrical Data

| | |
|---|---|
| Heater Voltage | 6.3 Volts |
| Heater Current (approx.) | 0.6 Ampere |
| Direct Interelectrode Capacitances (approx.) | |
| Cathode to All Other Electrodes | 5 μf |
| Grid No. 1 to All Other Electrodes | 6 μf |
| External Conductive Coating to Anode ¹ | 1500 μf Max. 750 μf Min. |
| Ion Trap Magnet | External, Single Field Type |

Mechanical Data

| | |
|---|---------------------------------------|
| Minimum Useful Screen Dimensions | 10 $\frac{3}{4}$ x 14 $\frac{1}{4}$ " |
| Bulb Contact, (Recessed Small Cavity Cap) | J1-21 |
| Base, (Small Shell Duodecal 6-Pin) | B6-63 |
| Basing | 12L |

RATINGS

Maximum Ratings (Design Center Values)

| | |
|--|------------------------|
| Anode Voltage | 16,000 Volts dc |
| Grid No. 4 (Focusing Electrode) Voltage | -500 to +1000 Volts dc |
| Grid No. 2 Voltage | 500 Volts dc |
| Grid No. 1 Voltage | |
| Negative Bias Value | 125 Volts dc |
| Positive Bias Value | 0 Volts dc |
| Positive Peak Value | 2 Volts |
| Peak Heater-Cathode Voltage | |
| Heater Negative with Respect to Cathode | |
| During Warm-up Period not to Exceed 15 Seconds | 410 Volts dc |
| After Equipment Warm-up Period | 180 Volts dc |
| Heater Positive with Respect to Cathode | 180 Volts dc |

Notes:

¹External conductive coating must be grounded.

SYLVANIA PICTURE TUBES

TECHNICAL SECTION

NOVEMBER 1952

Vol. 19, No. 8

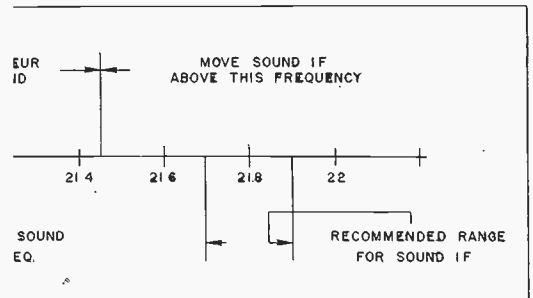
William O. Hamlin, Technical Editor

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(Continued on page 6)



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| TYPE | FACE Character or Facet | BODY | | | FOCUS/DEFLECTION | | MAX. LENGTH | TYPE | FACE Character or Facet | BODY | | | FOCUS/DEFLECTION | | MAX. LENGTH |
|-------|-------------------------|--------------------|---------------|--------------------|------------------|------------|-------------|------|-------------------------|--------------------|---------------|------|------------------|--|-------------|
| | | External or Offset | Magnification | External or Offset | Type | Mag. Angle | | | | External or Offset | Magnification | Type | Mag. Angle | | |
| 72P1 | Standard | Q | Yes | 25 | 115 | 12P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 82P1 | Standard | Q | Yes | 25 | 115 | 13P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 102P1 | Standard | Q | Yes | 25 | 115 | 14P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 12P1 | Standard | Q | Yes | 25 | 115 | 15P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 13P1 | Standard | Q | Yes | 25 | 115 | 16P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 14P1 | Standard | Q | Yes | 25 | 115 | 17P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 15P1 | Standard | Q | Yes | 25 | 115 | 18P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 16P1 | Standard | Q | Yes | 25 | 115 | 19P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 17P1 | Standard | Q | Yes | 25 | 115 | 20P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 18P1 | Standard | Q | Yes | 25 | 115 | 21P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 19P1 | Standard | Q | Yes | 25 | 115 | 22P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 20P1 | Standard | Q | Yes | 25 | 115 | 23P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 21P1 | Standard | Q | Yes | 25 | 115 | 24P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 22P1 | Standard | Q | Yes | 25 | 115 | 25P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 23P1 | Standard | Q | Yes | 25 | 115 | 26P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 24P1 | Standard | Q | Yes | 25 | 115 | 27P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 25P1 | Standard | Q | Yes | 25 | 115 | 28P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 26P1 | Standard | Q | Yes | 25 | 115 | 29P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 27P1 | Standard | Q | Yes | 25 | 115 | 30P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 28P1 | Standard | Q | Yes | 25 | 115 | 31P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 29P1 | Standard | Q | Yes | 25 | 115 | 32P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 30P1 | Standard | Q | Yes | 25 | 115 | 33P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 31P1 | Standard | Q | Yes | 25 | 115 | 34P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 32P1 | Standard | Q | Yes | 25 | 115 | 35P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 33P1 | Standard | Q | Yes | 25 | 115 | 36P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 34P1 | Standard | Q | Yes | 25 | 115 | 37P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 35P1 | Standard | Q | Yes | 25 | 115 | 38P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 36P1 | Standard | Q | Yes | 25 | 115 | 39P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 37P1 | Standard | Q | Yes | 25 | 115 | 40P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 38P1 | Standard | Q | Yes | 25 | 115 | 41P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 39P1 | Standard | Q | Yes | 25 | 115 | 42P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 40P1 | Standard | Q | Yes | 25 | 115 | 43P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 41P1 | Standard | Q | Yes | 25 | 115 | 44P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 42P1 | Standard | Q | Yes | 25 | 115 | 45P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 43P1 | Standard | Q | Yes | 25 | 115 | 46P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 44P1 | Standard | Q | Yes | 25 | 115 | 47P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 45P1 | Standard | Q | Yes | 25 | 115 | 48P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 46P1 | Standard | Q | Yes | 25 | 115 | 49P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 47P1 | Standard | Q | Yes | 25 | 115 | 50P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 48P1 | Standard | Q | Yes | 25 | 115 | 51P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 49P1 | Standard | Q | Yes | 25 | 115 | 52P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 50P1 | Standard | Q | Yes | 25 | 115 | 53P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 51P1 | Standard | Q | Yes | 25 | 115 | 54P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 52P1 | Standard | Q | Yes | 25 | 115 | 55P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 53P1 | Standard | Q | Yes | 25 | 115 | 56P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 54P1 | Standard | Q | Yes | 25 | 115 | 57P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 55P1 | Standard | Q | Yes | 25 | 115 | 58P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 56P1 | Standard | Q | Yes | 25 | 115 | 59P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 57P1 | Standard | Q | Yes | 25 | 115 | 60P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 58P1 | Standard | Q | Yes | 25 | 115 | 61P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 59P1 | Standard | Q | Yes | 25 | 115 | 62P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 60P1 | Standard | Q | Yes | 25 | 115 | 63P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 61P1 | Standard | Q | Yes | 25 | 115 | 64P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 62P1 | Standard | Q | Yes | 25 | 115 | 65P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 63P1 | Standard | Q | Yes | 25 | 115 | 66P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 64P1 | Standard | Q | Yes | 25 | 115 | 67P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 65P1 | Standard | Q | Yes | 25 | 115 | 68P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 66P1 | Standard | Q | Yes | 25 | 115 | 69P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 67P1 | Standard | Q | Yes | 25 | 115 | 70P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 68P1 | Standard | Q | Yes | 25 | 115 | 71P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 69P1 | Standard | Q | Yes | 25 | 115 | 72P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 70P1 | Standard | Q | Yes | 25 | 115 | 73P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 71P1 | Standard | Q | Yes | 25 | 115 | 74P1 | Standard | Q | Yes | 25 | 115 | | | | |
| 72P1 | Standard | Q | Yes | 25 | 115 | 75P1 | Standard | Q | Yes | 25 | 115 | | | | |

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It should be pointed out that this is a case of interference where the difficulty is 100% at the receiver, since the problem is one of fundamental frequency reception. It is possible that a signal could be received from thousands of miles away by short wave skip if the tv receiver did not have sufficient isolation between the if strip and antenna. Fortunately, many receivers of recent vintage are using 44 mc if's², and the 21.25 mc if receivers can easily be cured of this trouble.

Two methods may be used. The first method is to prevent the short wave signal from entering the set by installing a high pass filter in the transmission line at the point of connection to the receiver. A high pass filter will pass all signals above a certain frequency, (which is around 50 mc in one well-known make) and attenuate all signals below this frequency (See Figure 1)³. This type of filter is available for either 300 ohm or coaxial lines. It will be quite effective for eliminating not only 21 mc amateur signals, but all short wave signals, if installed at the antenna terminals of the receiver and grounded to the chassis. If a booster is used, be sure to place the filter at the terminals of the set, since the line between the set and booster can also pick up signals.

A second method, that may be better where a very strong interfering signal is received, is to realign the if stages of the tv receiver to frequencies above 21.45 mc. The best frequencies would be 21.7 or 21.9 mc, if there is no loss of gain or change in the waveform (See Figure 2). To do this job you must have a sweep frequency generator such as the Sylvania Type 500 sweep generator, an oscilloscope (Sylvania Type 132 or 400), and a marker generator

(Sylvania Type 501) or an accurately calibrated signal generator.

The procedure will vary slightly between sets with a separate sound if channel and those with inter-carrier sound. The 4.5 mc inter-carrier sound stages will not have to be retuned. The first step is to connect the signal and marker generators to the front of the if strip and the 'scope to the video detector, as recommended in the manufacturer's instruction manual. Set the sweep width of the generator to 10 mc and the center frequency to the if frequency as given by the set manufacturer, which would be about 23.25 mc for a 21.25 mc sound carrier. Now adjust the signal generator's rf attenuator and the gain on the 'scope for a convenient size 'scope pattern. These gain settings are to be used as a reference point to detect any change in amplification due to realignment; so, make a note of the settings and 'scope pattern amplitude. To realign the sound to 21.7 mc follow the manufacturer's instructions for if alignment adding .45 mc to each if frequency given. Follow the waveforms for the particular set you are working on and use the marker generator to help you do the alignment job accurately stage

(Continued on page 6)

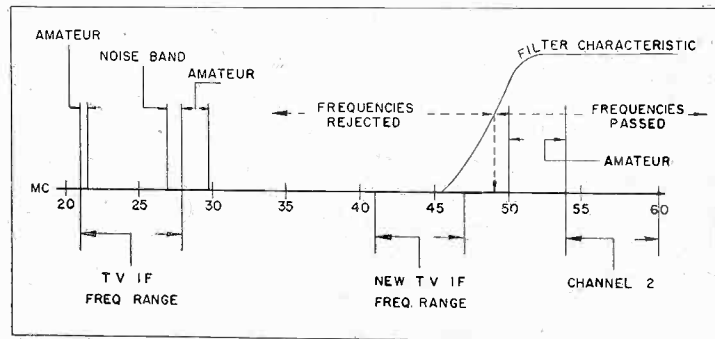


Figure 1. Characteristics of a typical high-pass filter.

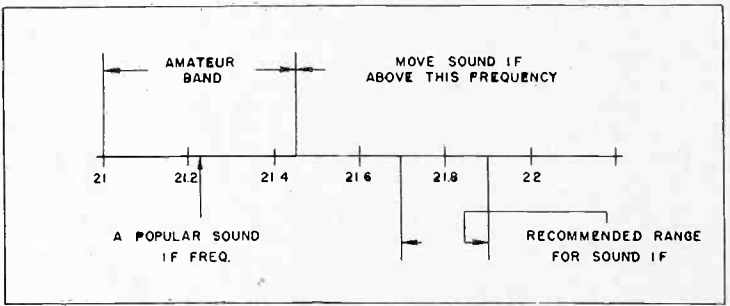


Figure 2. Frequency spectrum of the 21 MC region.

NEW TV

PICTURE TUBE COMPARISON CHART

Your Sylvania Distributor has a new Television Picture Tube Comparison Chart now. And it's yours free for the asking. Designed especially for wall use at the work or service shops, this handsome chart is a convenient 17 by 22 inches.

Concise and clearly arranged, the new Picture Tube Comparison Chart lists only the basic picture tube characteristics most needed by the television technician who desires a quick, to-follow guide. The chart is substantially complete as to tube types listed.

Don't pass up this great free offer. See your Sylvania Distributor today.

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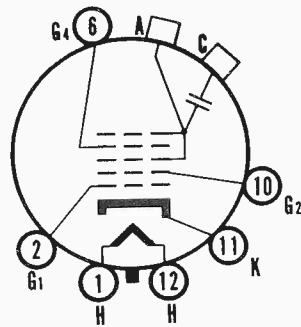
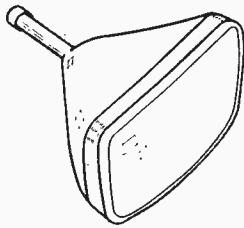
On the credit side, manufacturers are making more reliable sets and the public is becoming more tolerant of minor defects in pictures, with the result that paying calls have dropped to an average of 3.5 per year compared to 5.5 for 1950. At an average of \$12.50 per call including parts and with an estimated average of 17.5 million sets in use in 1951, this means that a minimum of 300 quarters of a billion dollars will be spent this year on repairs.

Less than 5 per cent of the TV sets in use are under service contracts.

Sylvania Type 17LP4/17VP4

TELEVISION PICTURE TUBE

| | |
|-----------------------|---------------------------------|
| 17" Direct Viewed | Rectangular Glass Type |
| Cylindrical Faceplate | Gray Filter Glass |
| Magnetic Deflection | Low Voltage Electrostatic Focus |
| Single Field Ion Trap | External Conductive Coating |



12-L

CHARACTERISTICS

| | |
|--|-----------------------------|
| General Data | |
| Focusing Method | Electrostatic |
| Deflecting Method | Magnetic |
| Deflecting Angle (approx.) | 65 Degrees |
| Horizontal | 70 Degrees |
| Diagonal | P4 |
| Phosphor | White |
| Fluorescence | Medium |
| Persistence | Gray Filter Glass |
| Faceplate | 72 Percent |
| Light Transmittance (approx.) | |
| Electrical Data | |
| Heater Voltage | 6.3 Volts |
| Heater Current (approx.) | 0.6 Ampere |
| Direct Interelectrode Capacitances (approx.) | |
| Cathode to All Other Electrodes | 5 μf |
| Grid No. 1 to All Other Electrodes | 6 μf |
| External Conductive Coating to Anode | 1500 μf Max. 750 μf Min. |
| Ion Trap Magnet | External, Single Field Type |
| Mechanical Data | |
| Minimum Useful Screen Dimensions | 10 3/4" x 14 1/4" |
| Bulb Contact, (Recessed Small Cavity Cap) | J1-21 |
| Base, (Small Shell Duodecal 6-Pin) | B6-63 |
| Basing | 12L |

RATINGS

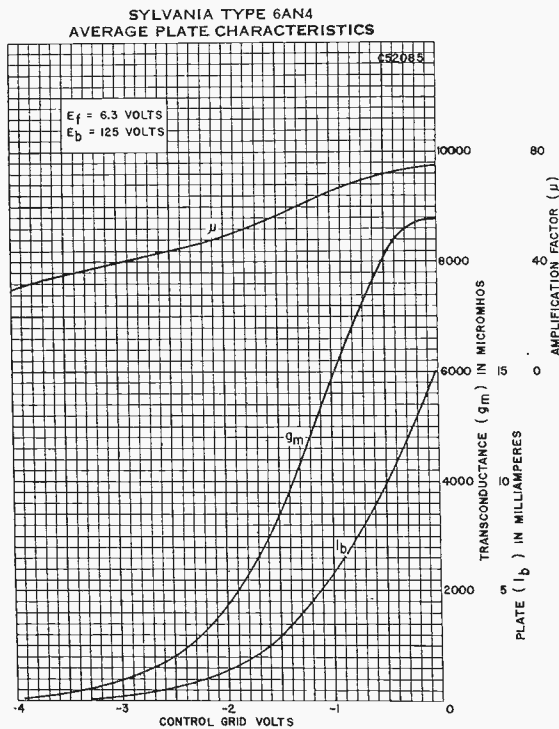
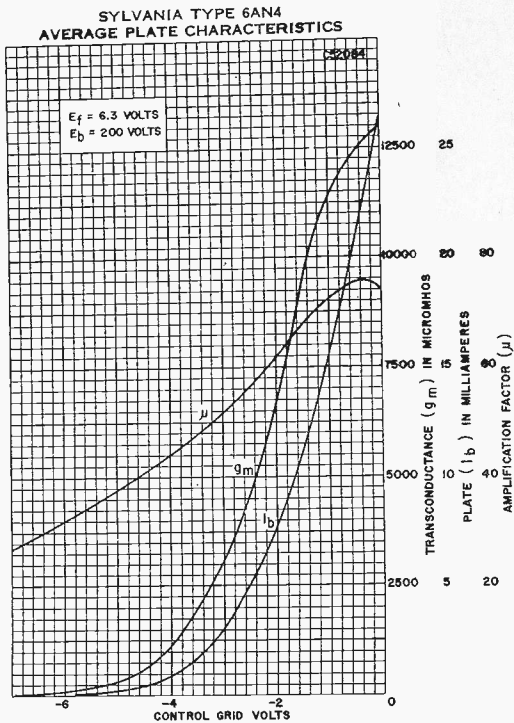
| | |
|--|------------------------|
| Maximum Ratings (Design Center Values) | |
| Anode Voltage | 16,000 Volts dc |
| Grid No. 4 (Focusing Electrode) Voltage | -500 to +1000 Volts dc |
| Grid No. 2 Voltage | 500 Volts dc |
| Grid No. 1 Voltage | |
| Negative Bias Value | 125 Volts dc |
| Positive Bias Value | 0 Volts dc |
| Positive Peak Value | 2 Volts |
| Peak Heater-Cathode Voltage | |
| Heater Negative with Respect to Cathode | |
| During Warm-up Period not to Exceed 15 Seconds | 410 Volts dc |
| After Equipment Warm-up Period | 180 Volts dc |
| Heater Positive with Respect to Cathode | 180 Volts dc |

Notes:

¹External conductive coating must be grounded.

A NEW TELEVISION IF INTERCEDENCE

6AN4 (cont'd)



SYLVANIA RADIO TUBES

Issued as a supplement to the manual in Sylvania News for October 1952

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(Sylvania Type 501) or an accurately calibrated signal generator. The procedure will vary slightly between sets with a separate sound i f channel and those with inter-carrier sound. The 4.5 mc inter-carrier sound stages will not have to be retuned. The first step is to connect the signal and marker generators to the front of the i f strip and the 'scope to the video detector, as recommended in the manufacturer's instruction manual. Set the sweep width of the generator to 10 mc and the center frequency to the i f frequency as given by the set manufacturer, which would be about 23.25 mc for a 21.25 mc sound carrier. Now adjust the signal generator's r f attenuator and the gain on the 'scope for a convenient size 'scope pattern. These gain settings are to be used as a reference point to detect any change in amplification due to realignment; so, make a note of the settings and 'scope pattern amplitude. To realign the sound to 21.7 mc follow the manufacturer's instructions for i f alignment adding .45 mc to each i f frequency given. Follow the waveforms for the particular set you are working on and use the marker generator to help you do the alignment job accurately stage

(Continued on page 6)

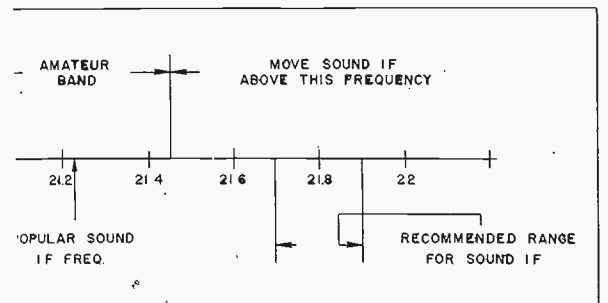


Figure 2. Frequency spectrum of the 21 MC region.

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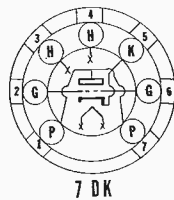
Don't pass up this great free offer. See your Sylvania Distributor today.

TV Service Goes On C.O.D. Basis

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Less than 5 per cent of the TV sets in use are under service contracts



Sylvania Type 6AN4

UHF AMPLIFIER-MIXER

PHYSICAL SPECIFICATIONS

| | |
|-----------------------------|------------------------|
| Base..... | Miniature Button 7 Pin |
| Bulb..... | T-5 1/2" |
| Maximum Overall Length..... | 1 3/4" |
| Maximum Seated Height..... | 1 1/2" |
| Mounting Position..... | Any |
| Basing..... | 7DK |

RATINGS

| | |
|--|------------|
| Heater Voltage..... | 6.3 Volts |
| Maximum Plate Voltage..... | 300 Volts |
| Maximum Plate Dissipation..... | 4 Watts |
| Maximum Cathode Current..... | 30 Ma. |
| Maximum Heater-Cathode Voltage (DC or Peak)..... | 100 Volts |
| Maximum Grid Circuit Resistance: | |
| Fixed Bias..... | 0.1 Megohm |
| Cathode Bias..... | 0.5 Megohm |

TYPICAL OPERATION

Class A Amplifier

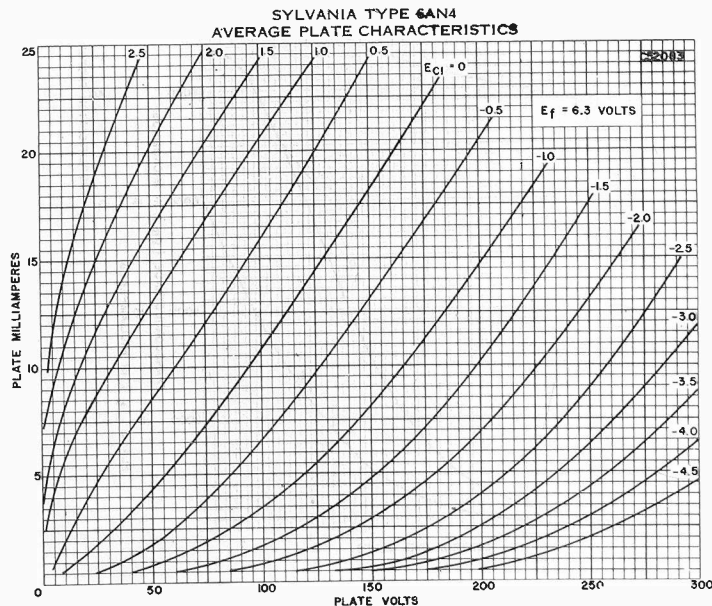
| | |
|--|------------------|
| Heater Voltage..... | 6.3 Volts |
| Heater Current..... | 225 Ma. |
| Plate Voltage..... | 200 Volts |
| Cathode Bias Resistor..... | 100 Ohms |
| Plate Current..... | 13 Ma. |
| Transconductance..... | 10,000 μ hos |
| Amplification Factor..... | 70 |
| Grid Voltage for $I_b = 20 \mu$ a..... | -7 Volts |

MIXER SERVICE

| | |
|---|----------------|
| Plate Voltage..... | 125 Volts |
| Cathode Bias Resistor..... | 270 Ohms |
| Plate Current..... | 7 Ma. |
| Oscillator Injection Voltage (RMS)..... | 1.4 Volts |
| Conversion Conductance..... | 2900 μ hos |

APPLICATION

Miniature high mu triode designed for use as a grounded grid amplifier or mixer in u h f television applications.



SYLVANIA RADIO TUBES

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17LP4/17VP4 (cont'd)

TECHNICAL SECTION

OCTOBER 1952 Vol. 19, No. 8
William O. Hamlin, Technical Editor

Recommended Operating Conditions

| | |
|--|----------------------|
| Anode Voltage ² | 14,000 Volts dc |
| Grid No. 4 Voltage..... | -56 to +310 Volts dc |
| Grid No. 2 Voltage..... | 300 Volts dc |
| Grid No. 1 Voltage ³ Required for Cutoff..... | -33 to -77 Volts dc |
| Ion Trap Magnet Strength (approx.)..... | 35 Gauss |

Circuit Values

| | |
|------------------------------------|------------------|
| Grid No. 1 Circuit Resistance..... | 1.5 Megohms Max. |
|------------------------------------|------------------|

Notes:

2. Brilliance and definition decrease with decreasing anode voltage. In general, the anode voltage should not be less than this value.
3. Visual extinction of undeflected focused spot.

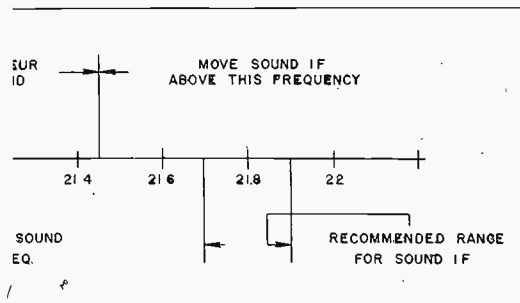
WARNING: X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at higher than the manufacturer's Maximum Rated Anode Voltage or 16,000 volts, whichever is less.

This information in Sylvania News is furnished without assuming any obligations

(Sylvania Type 501) or an accurately calibrated signal generator.

The procedure will vary slightly between sets with a separate sound if channel and those with inter-carrier sound. The 4.5 mc inter-carrier sound stages will not have to be retuned. The first step is to connect the signal and marker generators to the front of the i f strip and the 'scope to the video detector, as recommended in the manufacturer's instruction manual. Set the sweep width of the generator to 10 mc and the center frequency to the i f frequency as given by the set manufacturer, which would be about 23.25 mc for a 21.25 mc sound carrier. Now adjust the signal generator's r f attenuator and the gain on the 'scope for a convenient size 'scope pattern. These gain settings are to be used as a reference point to detect any change in amplification due to realignment; so, make a note of the settings and 'scope pattern amplitude. To realign the sound to 21.7 mc follow the manufacturer's instructions for i f alignment adding .45 mc to each i f frequency given. Follow the waveforms for the particular set you are working on and use the marker generator to help you do the alignment job accurately stage

(Continued on page 6)



Frequency spectrum of the 21 MC region.

SYLVANIA PICTURE TUBES

Issued as a supplement to the manual in Sylvania News for October 1952

IF INTERFERENCE (Cont.)

by stage. If a separate sound if is used it will be necessary to align the sound discriminator and if's to 21.7 mc.

Observe the overall response waveform and gain, then compare this with the gain and waveform taken before the frequency was changed.

If it is found that the if cannot be aligned at the higher frequency with the proper waveform and gain, try 21.45 mc sound and 25.95 mc video frequencies. The video will always be 4.5 mc higher and the adjacent

carrier trap 6 mc higher than the sound if frequency.

After the if's are aligned it will be necessary to touch up the high frequency oscillator trimmer. Follow the manufacturer's instructions in this procedure. The oscillator is above the frequency of the signal received so that the oscillator frequency must be moved up to produce the higher if frequency. Little difficulty should be encountered in this operation because the maximum necessary to move the frequency is about 450 kc for a 21.7 mc sound if. This is only slightly more than the

allowable frequency drift of the oscillator.

The rf trimmers might not have to be touched, but this would be a good opportunity to check them. There will be a slight change in tracking, of course, with the different if frequency. However, the change is so small that the fine tuning control on most sets will correct for this slight discrepancy.

¹ P. S. Rand, Television Interference, page 61.

² SYLVANIA NEWS, September, 1950.

³ SYLVANIA NEWS, October, 1949.

MULTIPLE TV-FM RECEIVER OPERATION FROM ONE ANTENNA

By C. A. Peterson and R. L. Bickmire -- Commercial Engineering

Serviceshops, tv sales departments and other multiple set installations find it more convenient and economical to operate many tv and fm receivers from one outdoor antenna. Better reception is obtained by impedance matching the main antenna feeder line to the lines going to each set.

Without matching, there will be a greater interaction between sets; i.e., the tuning of one set will affect reception of other sets on the same antenna system. There may be excessive loss of signal between the antenna and the sets, especially if the line is long. The mismatch will also cause the line to have antenna-like properties; it will pick up more external noise and undesired signals than a well-matched line.

The only limitation to the number of receivers that may be connected to a common line when proper matching is used is the power taken

by each receiver and its matching section. By using boosters and matching inputs and outputs the number of receivers that can be operated from one antenna is almost unlimited.

When two 300-ohm input receivers are connected in parallel with an antenna feeder made of 300-ohm Twin-Lead, the receivers present a 150 ohm impedance to the main feeder which is a two-to-one mismatch (See Figure 1). This can be remedied by a simple resistor matching network that will allow the antenna, and each receiver, to "see" 300 ohms.

The receiver inputs should be series connected across the feeder (See Figure 2A), and the proper terminating or matching resistors (R_{T1} , R_{T2} , R_{T3}), added across the point of connection to make both the main line and individual receiver lines see 300 ohms termination resistance (See Figure 2B). Our

problem is to find the value of these resistors.

Since all the feeder lines into the network are 300 ohms it is obvious that the terminating or matching resistors will be equal ($R_{T1} = R_{T2} = R_{T3}$). This fact greatly simplifies the solution. The resistance of each branch, consisting of 300 ohms in parallel with its matching resistor, can be represented in an equation for two parallel resistors as:

(Equation 1)

$$R_{\text{total}} = \frac{300 R_T}{R_T + 300}$$

The two output branches going to the receivers are in series across the main line so that the total resistance across R_{T1} and the main line is:

(Equation 2)

$$R_{\text{total}} = 2 \times \frac{300 R_T}{R_T + 300}$$

(Continued on page 8)

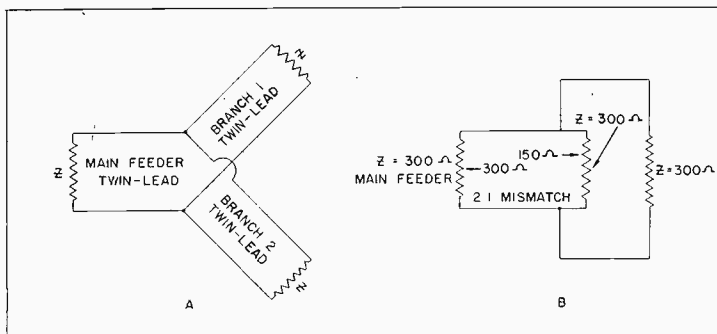


Figure 1. Mismatched feeders.

Figure 1A. Two feeders parallel connected across primary feeder.

Figure 1B. Impedance of Figure 1A.

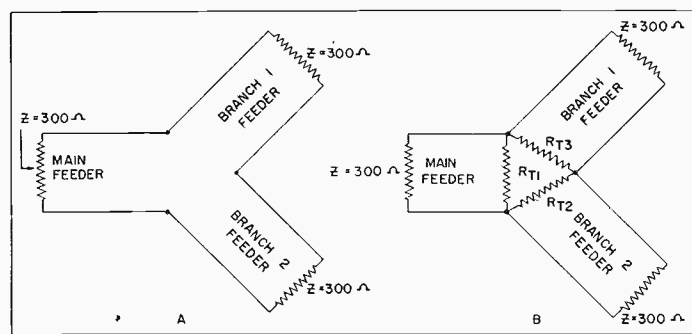


Figure 2. Matching the feeders.

Figure 2A. Two feeders series connected across primary feeder.

Figure 2B. With matching network.

NEW SETTINGS FOR SYLVANIA TUBE TESTERS

Below is a complete listing of all additions and revisions to charts No. 15845-G (for use in 139-140 tube testers) and No. 18325-C (for use in 219-220 tube testers) from

January 1952 to date. This information supersedes all previous settings for the tubes listed and should be used for best results when testing tubes on Sylvania Tube Testers.

139-140 TUBE TESTER SETTINGS

| Tube | A | B | C | D | E | F | G | Test |
|--------------------|------|---|---|---|--------|---------|----------|--------|
| 01A..... | 5 | 0 | — | 0 | 1 | 3 | 74 | U |
| 6AH4..... | 6.3 | 0 | — | 0 | 3 | 5 | 24 | Y |
| 6BF6 (Change)..... | | | | | | | 57 | X T |
| 6U8..... | 6.3 | 0 | — | 0 | 3 1 | 36 5 | 83 20 | Y W |
| 12AZ7..... | 12.6 | 0 | 5 | 0 | 1 3 | 3 7 | 29 29 | X X |
| 5687..... | 12.6 | 0 | 9 | 0 | 1 4 | 3 7 | 21 21 | X X |
| 5879..... | 6.3 | 0 | — | 0 | 8 | 27 | 15 | V |

219-220 TUBE TESTER SETTINGS

| Tube | A | B | C | D | E | F | G | K |
|--------------------|------|---|--------------|----------|--------|--------------|----------|--------|
| 2E32*..... | 1.25 | 3 | 5 | 64 | 5 | 024SU | 1 | — |
| 2E36*..... | 1.25 | 3 | 5 | 76 | 5 | 024SU | 1 | — |
| 2E41*..... | 1.25 | 4 | 6S 6 | 48 42 | 6 6 | 025T T | 1 3** | |
| 3B26..... | 2.5 | 2 | 7 | 46 | 7 | T | 9** | 7 |
| 6AE5..... | 6.3 | 2 | 7S | 35 | 7 | 5X | 3 | 8 |
| 6AH4..... | 6.3 | 2 | 7S | 17 | 7 | 1Z | 5 | 8 |
| 6AK4..... | 6.3 | 3 | 6 | 65 | 6 | 1SZ | 8 | 5 |
| 6CB6 (Change)..... | | | | 30 | | 167Y | | |
| 6D7 (Change)..... | | | 7S | 71 | 7 | 039X | | |
| 6U8..... | 6.3 | 4 | 58S 57S | 69 17 | 5 5 | 23Z 9Y | 6 1 | 7 8 |
| 6X8..... | 6.3 | 4 | 5S 5S | 33 44 | 5 5 | 78Y 2X | 9 3 | 6 6 |
| 12AZ7..... | 12.6 | 4 | 589S 359S | 36 36 | 5 5 | 2V 7V | 1 6 | 3 8 |
| 5687..... | 12.6 | 4 | 568 358 | 41 41 | 5 5 | 2SZ 7SZ | 1 9 | 3 6 |
| 5763..... | 6.3 | 4 | 59 58 | 10 10 | 5 5 | 068Y 069Y | 1 1 | 7 7 |
| 5829*..... | 6.3 | 3 | 57 25 | 65 65 | 5 5 | SX SX | 1 6 | 2 7 |
| 5879..... | 6.3 | 4 | 5 | 51 | 5 | 17SU | 8 | 3 |

*This tube to be inserted with the red dot to the operator's left. The extreme left hand tube pin must be inserted in the extreme left hand socket pin.

**Diode gas test does not apply.

Service Hints

RCA 630 TV—Vertical control will only hold picture in place for an hour or so, then it will slowly roll again. In checking, all the parts in the vertical section and sync sections were found to be okay. Trouble was found to be the .01 capacitor between 6K6 horizontal oscillator and 6SN7 horizontal discharge tube (C177 in Rider's TV III). The negative voltage (—100v) would leak through the capacitor and 6800 ohms resistor to ground, changing the bias on the 6J6 vertical oscillator.—O. F. Hamm, St. Louis, Missouri.

TO SAVE TIME in making the proper settings on my Sylvania Type 220 tube tester when testing cathode ray tubes, I have placed markings like this ▼ (made out of white tape) near the numeral settings for A B C D E and K for the first test. For G and F, I have placed square markings ■ for the complete test. Now I do not have to refer to any chart for proper settings; I merely turn the knobs and push levers to these markings. — M. Suofka, W9KYK, Chicago, Illinois.

(Editor's Note: Since the settings are the same for all CR tubes presently shown on Sylvania charts, the tests are always repetitive for those types. This would be a worthwhile aid to the serviceman who is spending a lot of time checking CR tubes.)

DUMONT; MODEL RA 112A—The complaint on this chassis was that as the set was turned on and allowed to warm up a raster would appear with loss of vertical and horizontal sync, out of focus, a bright vertical bar on the left side and fade away.

By removing the 6W4, the raster would reappear with above symptoms and remain on the screen. After trouble-shooting the chassis, I found a .02 μ f capacitor in the yoke circuit was shorted.

The defective capacitor removed from the chassis had a 400 volt

rating; checking against the manufacturer's data the capacitor should have had a 600 volt rating. Replacing the defective capacitor with a good .02 mf 600 volt capacitor restored the receiver to proper operation.—V. Cama, New York, N.Y.

FREED EISEMAN TV—Some of these receivers exhibit a 60-cycle buzzing that might be mistaken for the type buzz heard with inter-carrier sets. However, it will be found that this buzz changes frequency when the vertical hold control is rotated. Evidently, radiation from leads in the vertical sweep circuit is reaching the audio system.

Method for reducing the buzz is as follows: First, move the unshielded "hot" ends of audio cables away from the cable harness, both at the 6T8 audio tube and at the tv-phono switch. Next, the vertical oscillator transformer laminations may be mechanically vibrating. This noise can be eliminated by crimping the lamination strap with large pliers. Then, reroute yellow lead going from vertical height control to the 100 K resistor (R166 on schematic) in the vertical blocking oscillator of the chassis *instead* of running in the cabling past the grid of the 6T8 audio tube.—P. C. Sanders, Independence, La.

TO REMOVE HORIZONTAL SCANNING TRANSFORMER from plastic container when fitted tightly, remove center bolt, then wires and capacitor. Use Sylvania 250 watt heat lamp to expand case. As case expands, have new transformer ready to drop in place. Remove old transformer and replace.—L. L. Grisham, Los Angeles, California.

INTERMITTENT SNOWY PICTURES (ON AIRLINE TV, MODEL 15 BR 3048)—A complaint of intermittent snowy pictures on all channels, with a decrease in volume and sound and picture not coming together—was traced to a poor connection on coil L 19 (video trap).

Apparently, wire breaks loose at coil lug. Resolder carefully, adding a short piece of wire if necessary—George's Radio Service, Santa Ana, Calif.

RCA RADIO-PHONO. COMBINATION, Model 67VI and 67 AVI: Set was completely out of alignment. Tubes checked okay. Set would track for five minutes, then would fall off. On pin 4 of 6SA7, a 0.1 mfd capacitor was open. (Voltage was only 60 volts instead of 100 volts.) Also, on pin 5 of the same tube, a 56 μ mf ceramic was leaking. Set tracked perfectly after these two components were replaced. Set was then peaked and operated satisfactorily.—R. D. Faiella, New York City.

Multiple TV - FM Receiver Operation

(Continued from page 6)

For proper matching we must make this resistance in parallel with R_{T1} equal to the main line impedance of 300 ohms. Using the equation for two parallel resistors again we get:

(Equation 3)

$$Z_{in} = 300 = \frac{2R_T \left(\frac{300 R_T}{300 + R_T} \right)}{R_T + 2 \left(\frac{300 R_T}{300 + R_T} \right)}$$

$$\text{Solving for } R_T: 300 = \frac{600 R_T}{900 + R_T}$$

$$270,000 + 300R_T = 600R_T$$

$$R_T = 900 \text{ ohms}$$

$$R_{T1} = R_{T2} = R_{T3} = 900 \text{ ohms.}$$

The foregoing has been developed for the specific case of two receivers and a common antenna where all three have the same input impedance. A simple general equation may thus be developed for more than two receivers provided that all impedances be the same whether 300, 72, 100 ohms, etc. It may be stated as:

(Equation 4)

$$R_T = \frac{Z_{in} (N + 1)}{N - 1}$$

where Z_{in} is the impedance of the line to which all receivers are to be matched, and N is the number of receivers to be connected to the common line.

MERCHANDISING SECTION

OCTOBER 1952

Vol. 19, No. 8

FILL YOUR CHRISTMAS STOCKINGS

FREE SAVE SYLVANIA TOKENS



Your purchase of Sylvania Tubes this fall can fill *all* your Christmas stockings . . . *free*. You can choose one or more valuable gifts for every member of your family from Sylvania's great list of over 25 handsome items. Here's how you join in the big Sylvania Christmas Gift Parade:

1. Until December 31st, your Sylvania Distributor will give you one Premium Token when you purchase 25 Sylvania radio tubes or one Sylvania TV Picture Tube.

2. Collect as many Tokens as you can.

3. Select your gift or gifts from the impressive list of prizes.

4. Fill in the official order form which you have received by mail from Sylvania and take it to your Sylvania Distributor with the required number of tokens. Additional order forms can be obtained from your Sylvania Distributor.

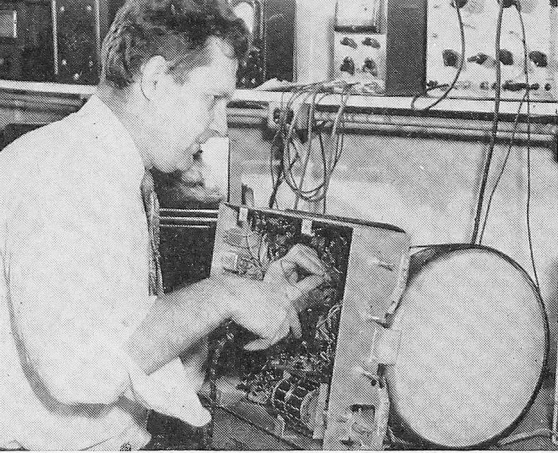
That's all you do. You'll receive your gift by mail about two weeks after you order.

Caution: Do not send your gift order to Sylvania. All orders must be sent to your Sylvania Distributor.

Start saving Sylvania Premium Tokens NOW. Remember you get one token free every time you buy one Sylvania Picture Tube or 25 Sylvania Receiving Tubes.

Here is a list of the valuable gifts you receive with Sylvania Premium Tokens:

| PRIZES | TOKENS |
|--------------------------|--------|
| 3 pr. Nylon Hose | 8 |
| Dutch Oven Chicken Fryer | 9 |
| Tackle Box | 10 |
| Woman's Gloves | 11 |
| Boxing Gloves | 11 |
| Doll | 12 |
| Ice Chest | 14 |
| Baseball Outfit | 15 |
| Carving Knife | 15 |
| Table Tennis Set | 16 |
| Steak Knife Set | 16 |
| Fishing Reel | 16 |
| Lighter | 16 |
| Doll Carriage | 18 |
| Fishing Rod | 19 |
| Desk Pen Set | 19 |
| Football Outfit | 20 |
| Table Lighter | 20 |
| Football | 21 |
| Golf Balls | 22 |
| Knife Sharpener | 22 |
| Pearls | 23 |
| Twin Dolls | 23 |
| Poker Chips | 24 |
| Rifle | 28 |
| Birthstone Ring | 31 |
| Sandwich Grill | 32 |
| Man's Wrist Watch | 38 |
| Woman's Wrist Watch | 38 |
| Electric Shaver | 39 |
| Camera | 45 |
| Deep Fryer | 46 |
| Blanket | 48 |



The accidental touching of a hot soldering iron while fusing wayward wire connections has left Vlcek's index finger and thumb heavily calloused. But Frank's most irksome habit is that shared by people with 20-20 vision—he forgets where he puts down his tools.

Intricate is a mild way to describe the thorny problems which every service dealer faces. To provide efficient service at a reasonable cost he has to maintain a well-equipped shop. He needs a staff of reliable, trained and loyal technicians who, in many cases, are as scarce as proverbial "hen's teeth." He must also study costs constantly, must master the involved routine of how to schedule pick-up calls, shop maintenance and outside installation orders, and the follow-through on delivery and service call-backs. On top of this, he must foster sound public relations, trying to fortify the public's confidence in television service which was shaken by a short-sighted few within the service industry.

The lot of dealers and servicemen may seem to be a sorry one, the problems insurmountable. But out in St. Louis there is a shining example

BLIND SERVICE DEALER SHOWS HOW TO RUN A SUCCESSFUL BUSINESS

of a television serviceman who has taken on these problems and one more besides. For Frank Vlcek (pronounced Bell-check), who operates the successful Missouri Radio & Television Co., is blind.

The way Gene Clayton, special correspondent of the *St. Louis Globe-Democrat*, who unearthed the singular Vlcek and his TV service operation, describes the blind TV serviceman's skill is something like this: "It's sheer wizardry the way his deft fingers creep over and under criss-crossing TV wires and glowing tubes to search out and eliminate the trouble."

Despite this wizardry of his fingertips, Vlcek had no clear sailing into success as a television serviceman. He was brought face to face with the cold reality of customers who were just a little reluctant to entrust their valuable television consoles and table models to a blind serviceman. He promptly found his own solution to that by hiring two sighted repairmen who could take care of some of the repair work both in customers' homes and in the shop. Owner Frank Vlcek, however, checks every set before it leaves his shop, and his musically-trained ear, sharpened by the absence of a sister sense organ, can promptly

detect any loudspeaker distortion.

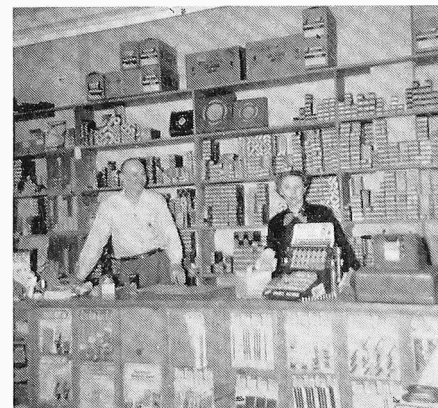
Clayton's report on Vlcek does not depict his TV service adventures as one big bed of roses. He points out how the blind TV serviceman used to have difficulty distinguishing the power of pilot lights which were similar in size. By labeling cabinet drawers in Braille and segregating lights of various sizes, Vlcek licked this difficulty. He can keep track of his inventory by stamping products in Braille as shipments arrive. Even though his fingers are heavily calloused by frequent, unintentional contacts with such hazardous tools as a sizzling soldering iron, Clayton reveals, Frank Vlcek's Braille-reading ability is not hampered. He manages to keep abreast of the latest advances in radio and television by fingering Braille Technical publications.

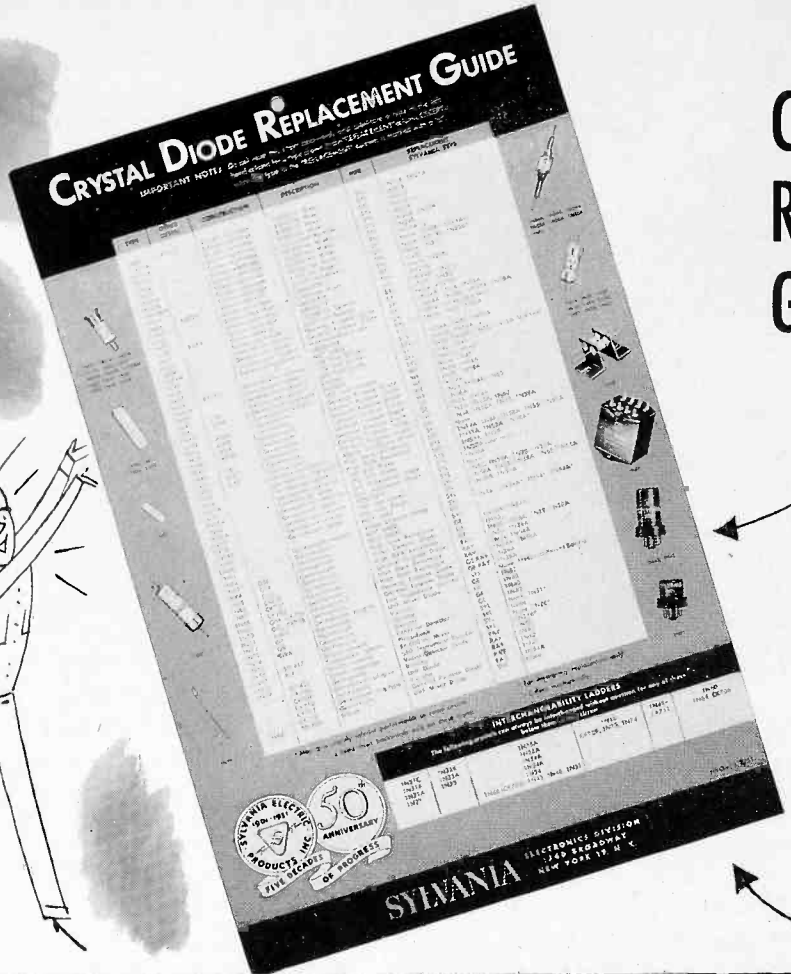
Blind since 7, after an attack of spinal meningitis, Frank Vlcek has been able to find laughter and brightness even in his dark world. He can remind dealers who are engrossed in service problems that business is not always as black as it seems. He is also living proof that technically skilled persons with seeming handicaps can be turned into staff asset by dealers who are in search of efficient, reliable, trained and loyal technicians.

SYLVANIA DISTRIBUTOR COVERS PLENTY OF TERRITORY

Rolfe Lungreen, the owner of R. F. Supply Company in Klamath Falls, Oregon doesn't let the grass grow under his feet. This exclusive Sylvania Distributor provides tubes and parts to service dealers in sparsely settled country principally devoted to farming and the lumber industry. This territory which extends to

Madras, Oregon (200 miles north), to Lakeview (125 miles east), the Cascade Mountains to the west, and as far south as Red and Alturas, California contains only 42 service businesses. That's real service in anybody's book. Hats off to Mr. and Mrs. Lungreen (shown in their store at right).





CRYSTAL DIODE REPLACEMENT GUIDE . . . FREE

Here's a new—free—helper you will want in your shop. It's the Sylvania Crystal Diode Replacement Guide. Over 70 types and other designs of diodes are listed with important information regarding their construction, description, manufacturer, and the Sylvania replacement type. A table of interchangeability ladders is also included.

Your free Sylvania Crystal Diode Replacement Guide can be obtained by writing Sylvania, Electronics Division, 1740 Broadway, New York 19, N. Y. Easy to read, printed in two colors, the Guide is available in two forms—wall chart or insert page for three-ring binder. Please specify which form you desire when you make your request.

DOUBLE-BRANDED TV TUBES

In three instances where similar and completely interchangeable TV picture tubes have been separately registered and assigned different RTMA type numbers, Sylvania is adopting the following double etches and labels: 17HP4/17RP4, 17LP4/17VP4, 20HP4A/20LP4.

These double-branded types are reaching distributors in some areas now. Where this has not yet occurred, Sylvania tubes are labeled 17HP4, 17LP4, or 20HP4A.

A somewhat different situation exists regarding the following type numbers: 21FP4A and 21LP4. The 21LP4 is not a registered type, so officially it does not exist. Nevertheless, at one time a few tubes branded 21LP4 were used in receivers. Because of the unofficial status, double branding with the equivalent 21FP4A will not be attempted. Any replacement demand for 21LP4 should be filled with type 21FP4A.



NEW INFORMATIVE FOLDERS FOR YOUR CUSTOMERS

Sylvania has just prepared two new, completely up-to-date folders designed for mailing to radio and television set owners. They are entitled: *What's Wrong With Your TV Set?* and *What's Wrong With Your Radio?* Each shows a picture of a chassis, each lists the hundreds of things that can go wrong. Both urge the reader to call an expert technician who uses good parts and charges a fair price. That's you, of course, if you order and use these sales-boosting folders.

Prices for each folder—with your imprint—are \$1.50 for 100, \$2.50 for 250, \$4.00 for 500, \$5.50 for 750, \$7.00 for 1000. Order your supply today from Advertising Department, 1100 Main Street, Buffalo, N. Y.

NEW SYLVANIA DOOR KNOB HANGER A SALES BUILDER

The new Sylvania door knob hanger is an old business builder newly dressed in modern style. Bright and eye-catching, this sales builder is readily available from your nearest Sylvania Distributor.

Sylvania door knob hangers have been printed in a variety of colors on several different pastel-colored card stocks. Dealers get an assortment of colors on each order. There is liberal space for dealer's imprint. These inexpensive new hangers are delivered with your own imprint for \$1.00 a hundred, \$1.75 for 250, \$3.00 for 500, or \$5.00 for 1000.

Here's a suggestion for distributing Sylvania door knob hangers. Make a deal with your neighborhood school children. That way, you will obtain the good will of the children—and their parents—too.





Don't Lose Your Share of the Profits; Order Your Sylvania Advertising Kit

Sylvania's sensational fall advertising promotion makes everybody happy. Service Dealer Al Davis, (right) owner of Al Davis Radio Drive-In in Los Angeles; Jim Pellham (left), general manager of Figart Radio Supply in Beverly Hills—a Sylvania Distributor for ten years; and W. C. Patterson, Sylvania Pacific Coast Regional Manager of Renewal Tubes Sales, are certainly pleased. And why shouldn't they be? Look who's on their team (yours, too, if you're using Sylvania's big fall advertising campaign)—Hollywood starlet Ann Blyth. She's holding a copy of one of the terrific national ads in which she endorses the service dealer who displays the Sylvania emblem.

It's not too late for you to cash in on Sylvania's great fall advertising program for service dealers—if you act now.

In *Life*, *Saturday Evening Post* and *Collier's* Ann Blyth and June Havoc are telling your prospects to look for *the man who displays the Sylvania*

emblem when they need expert radio or television service at a fair price. Sylvania's popular TV show *Beat the Clock* repeats the endorsement. *Be that man!* Order your kit today.

This big fall kit contains service emblems, eye-catching window and counter cards and window streamers

of Ann and June endorsing your business, reminder stickers, a book of radio announcements, and a hard-hitting government postal card for each month for the remainder of the year. The cost to you—just the postage on the cards. That's just 2 cents per prospect per month. All the other material is absolutely free.

You can't find a less costly method of promoting your business. Take advantage of this terrific fall campaign. Order yours today from your Sylvania Distributor or write Sylvania Advertising Department, 1100 Main Street, Buffalo 9, N. Y.

SYLVANIA NEWS

SYLVANIA ELECTRIC PRODUCTS INC.
1100 MAIN STREET
BUFFALO 9, N. Y.

Sec. 34.66 P. L. & R.
U. S. POSTAGE
PAID
Permit No. 3402
Buffalo, N. Y.

For Cannon Electric
P. O. Box 2684
Odessa, Texas

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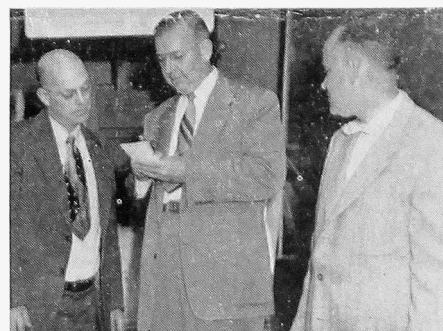
Form 3547 Requested

Vol. 19, No. 8

OCTOBER 1952

PUBLISHED BY
SYLVANIA ELECTRIC PRODUCTS INC.

MANUFACTURERS OF SYLVANIA RADIO TUBES, CATHODE RAY TUBES, ELECTRONIC DEVICES, FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, ELECTRIC LIGHT BULBS, PHOTOLAMPS, RADIO AND TELEVISION RECEIVERS.



A recent Sylvania Service Meeting held in Madison, Wis. under the auspices of Satterfield Radio Supply produced the scene shown above. A. W. Satterfield (center) is seen talking with Robert Steele of Steele Radio Service (left), winner of a Sylvania 221Z Polymeter. Salesman Walt Starkweather looks on.

In This Issue

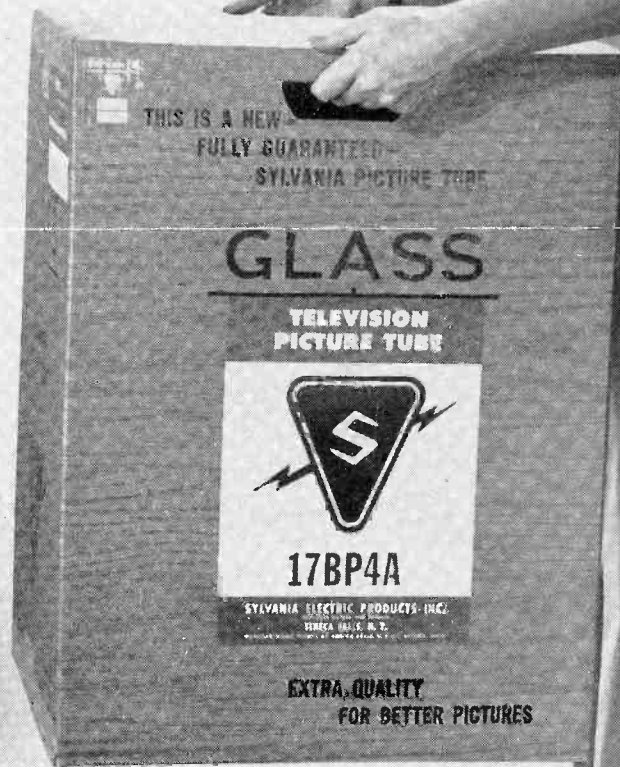
NEWS
REPLACING WORN OUT PICTURE TUBES

MERCHANDISING
FILL YOUR CHRISTMAS STOCKINGS;
SAVE SYLVANIA TOKENS

TECHNICAL
A NEW TV IF INTERFERENCE

SYLVANIA NEWS

NOVEMBER 1952



C. J. Luten, editor
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Sylvania Electric Products Inc.
Vol. 19, No. 9

NEW SYLVANIA TV TUBE CARTON REFLECTS QUALITY OF TUBE INSIDE



The continuous stream of magazine and newspaper articles concerning the skill of television service technicians and the quality of their replacement parts has been a major factor in Sylvania's decision to produce a handsome, distinctive carton for its TV picture tubes. Sylvania is now packing rectangular 16, 17, 20, and 21-inch TV picture tubes (the most popular sizes) in deluxe cartons to help the service dealer. To give him the opportunity to show the set owner that his organization is the finest and uses only the finest—new, fully guaranteed replacement picture tubes.

What an appearance the new Sylvania TV tube carton makes! Its distinctive design and good-looking wood-grain finish puts it in a class by

itself, and at home in even the finest living room where you may service a set. Its striking 8½ by 11-inch four-color display label has been found by survey to be the most attractive in the business today. Its stitched side eliminates unsightly taped joints. Its semi-gloss finish resists dirt and scuffing. New top label carries notice: Warranty Registration Card enclosed. New imprinted Sylvania sealing tape easily identifies the carton as factory sealed. Imprinted slogans attest that this Sylvania tube is new—fully guaranteed—and of extra quality.

That's not all the advantages of this carton. The service dealer will appreciate the convenient location of the code date and serial number sticker to permit (1) easy stock rotation, and (2) recording of serial

number. New helpful eye-catching top flap label facilitates stacking on sides without loss of identity. All cartons are correctly marked to indicate end that should be opened for safe removal of tube. Tubes are packed heavy end down for safe, no-tip stacking. Everyone will like the new, convenient hand holes designed for easy handling of the cartons.

The new Sylvania carton is being introduced across the country and is now available in most areas. Where not yet available, it will be shortly.

Every service dealer can make an impression when he uses the best and his customer can see that it looks like the best. Be sure you use highest quality Sylvania TV Picture Tubes in the new, handsome carton.

PHILADELPHIA GROUP EDUCATES PUBLIC

ON RADIO-TELEVISION SERVICING

The Joint Electronics and Radio Committee on Service is an industry-wide group in Philadelphia composed of elements from every segment of the electronics industry. Endorsement, formally or by participation in its functions, has come from the National Electronic Distributors Association, the Radio - Television Manufacturers Association, The Television Contractors Association, The Philadelphia Radio Service Men's Association, the Better Business Bureau of Philadelphia, and many others.

Primary accomplishments of the Committee have been a series of intra-industry meetings in Philadelphia which sharply decreased resentments observed on every side and which have brought a new and happier tone of cooperation to the industry, as well as mutual appreciation of industry position and needs. In addition, it has organized a Technical Education Advisory Panel which is successfully developing plans for the progressive education of technicians; it has obtained free and valuable time on radio and television stations for the education of the consumer; it has obtained free and valuable space in consumer publications to tell its story to its customers, the public.

Although the Committee was formed to work on a local level, and plans to continue doing so, it was inevitable that other communities should observe and attempt to emulate its efforts. Industry leaders in at least six other cities have requested and received detailed information on the Committee's program.

Among its future plans are the following:

1. Prepare and distribute an interesting and informative weekly article on television, its service, its

progress, and its contribution to the community to all neighborhood newspapers in the Philadelphia area under its signature and emblem.

2. Expand and improve its technical education program, particularly in view of the imminence of Ultra High Frequency broadcasting in the Philadelphia area.

3. Continue to bring together all segments of the industry in the community to foster harmony, understanding and cooperation.

4. Prepare a series of attention-

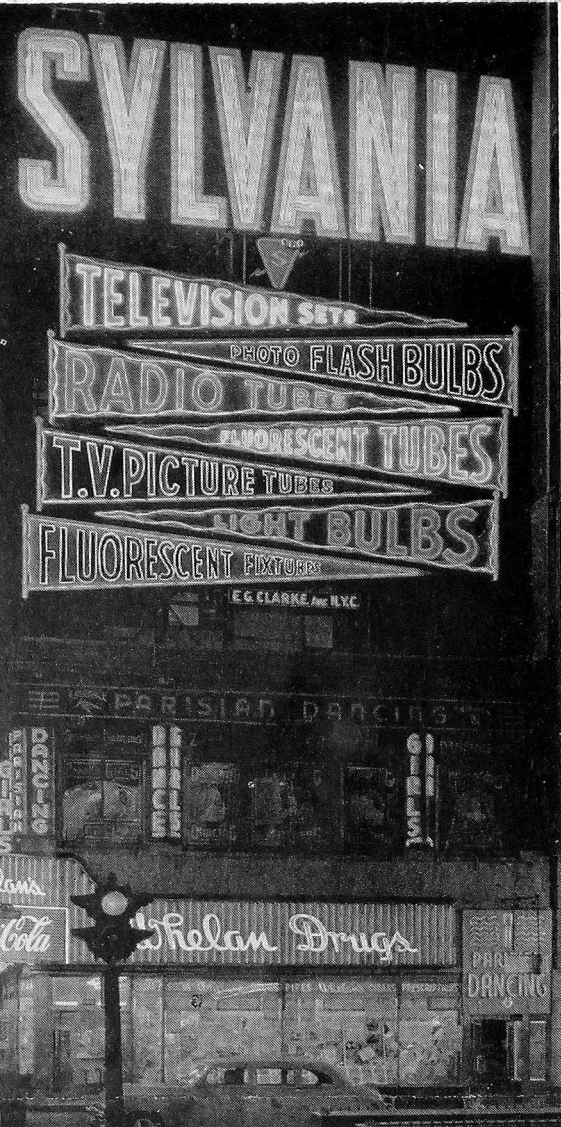
compelling envelope stuffers which would be provided to those segments of the industry which have heavy mailings to the public. These stuffers would feature cartoons and short copy and would tell the consumer what he can expect from his television receiver and his serviceman.

5. Continue to take advantage of all opportunities to tell the Committee's story via radio and television, before civic clubs and groups, in house organs, the daily press and the trade press; and, also, be alert to correct any undesirable trends in the industry.



The Joint Electronics and Radio Committee on Service in Philadelphia has as one of its aims a program to educate the TV set owning public on the high skill and quality parts it takes to service the average television set. Here is a window display that is being used to help do the job. The messages on the cards read:

1. Sponsored by Joint Electronics and Radio Committee on Service.
2. Dependable performance assured by use of standard brands.
3. The modern television receiver is so easy to operate that the average owner has no idea of the skill and equipment needed by the serviceman—to keep it in good working order.
4. Shown here are some of the things necessary for the work—and beyond them comes the wealth of specialized "know-how" required to use this equipment efficiently in rendering prompt accurate service on the hundreds of parts that comprise the average-television set!



Sylvania's big, new outdoor sign in New York's Times Square tells everyone who sees it about the Sylvania products that you sell.

NARTB PRESIDENT PREDICTS 97 NEW TV STATIONS NEXT YEAR

President Harold E. Fellows, of the National Association of Radio and Television Broadcasters, recently predicted the FCC would grant 250 TV construction permits by mid-1953 and estimated that 97 new television stations would be on the air by the end of next year. Mr. Fellows addressed a joint luncheon meeting of broadcasters and members of the Advertising Club at San Francisco.

Pointing out the technical advances that have been made since stations first went into operation, the NARTB leader said that experts now agree that it will take about six months for a VHF transmitter to turn the switches, and approximately double that period for UHF operators.

"On this basis," continued Mr. Fellows, "we could expect about 97 more TV stations to be on the air by the end of 1953. Perhaps there will be a nationwide service in five to

seven years. Manufacturers seem to be better equipped to meet the demand for receivers than for transmitters. Even so, when a television station recently went on the air in Denver, at a date that was unexpectedly early, the demand for television receivers was such that it could not be met . . . So if you're selling receivers, get stocked up for the bonanza when your first television station broadcasts its first signal to the general public."

Mr. Fellows admonished his audience, however, not to put the radio receivers "on the back shelf." He recalled that most broadcasters and most radio receiver manufacturers undersold radio in the early days of television. This was a mistake, he added, since the demand for radio sets continued to rise steadily and "radio broadcasters have never done more business."

SERVICE DEALER PROTECTION

Most radio and TV set owners carry, as a matter of course, a fire insurance policy to protect themselves financially should a fire damage their home. Most policy holders don't know that their insurance policy is voided automatically if a fire is caused by lightning striking an antenna unless an approved type of lightning arrestor is installed between a receiver and the antenna. Insurers assume such a protective device will eliminate the possibility of a fire occurring.

Fires have occurred in homes because lightning struck a radio or TV antenna. Courts have held that when the set installer failed to protect fully his customer (by neglecting to include a lightning arrestor) such

installer, rather than the insurance company, should be held liable for damages caused by his negligence.

Surveys show that many TV service contractors still fail to include the use of a lightning arrestor as a part of their standard installation. Such firms risk much too much. No TV installation should ever be made without including a lightning arrestor. Of course the customer should pay for the unit and labor involved. If he objects, get a release in writing. (The demand for such a release invariably clinches the sale). Also, be on the look-out when working presently installed sets, and you'll be surprised at the number of extra lightning arrestor installation jobs that can be obtained for the slight effort required.

August TV Production 171 Per Cent Over '51

Production of television receivers in August increased by 171 per cent over the corresponding month of 1951, as the radio output dropped three per cent, according to reports to RTMA.

RTMA estimated the industry's output at 397,769 TV sets compared with 146,705 units in August 1952. The August radio production was estimated at 543,802 units compared with 563,407 sets manufactured in the same 1951 month.

A break down of the August Radio report showed production of 235,728 home sets, 105,006 portables, 94,315 auto-receivers and 108,753 clock radios.

TV SIGNAL DISTRIBUTION SYSTEMS

SYLVANIA NEWS

TECHNICAL SECTION

NOVEMBER 1952 Vol. 19, No. 9

William O. Hamlin, Technical Editor

By P. M. Reinhardt --- Technical Publications Section

This information in Sylvania News is furnished without assuming any obligations

A previous SYLVANIA NEWS article has dealt with the problem of matching several t v receivers to a single antenna. Mention was made of the absorption of power by the receivers and matching resistors as being the factor which limited the number of receivers that could be connected together before a booster amplifier was required.

Reactive matching LC networks might be used in place of the resistors to reduce this absorption, but matching then becomes a function of the frequency, hence such LC networks are essentially single frequency devices which would require tuning from channel to channel. Such tunable networks would not be practicable for use in the average t v installation. The answer to the problem is to use either resistors alone, or resistors and "broad-band" amplifiers in cases where absorption requires additional amplification.

Such distribution systems are useful in stores, apartment houses, hotels and institutions. Many apartment house owners will not permit installation of roof-top antennas. Quite often the built-in antenna will not give satisfactory results, and even where the apartment house owner permits a "forest" of antennas on the roof, trouble may arise due to "ghosts" from reflections of the signal from other antennas.

A logical extension of this idea is the Community Antenna System, where a single group of favorably located antennas is used to feed a number of receivers via coaxial cables. Thus favorable t v reception may be obtained in an otherwise unfavorable location.

Using the Community Antenna System, the t v set owner is relieved of the bother of maintaining an

antenna, a factor which may involve considerable expense and trouble in

locations where the weather and wind conditions are often adverse.

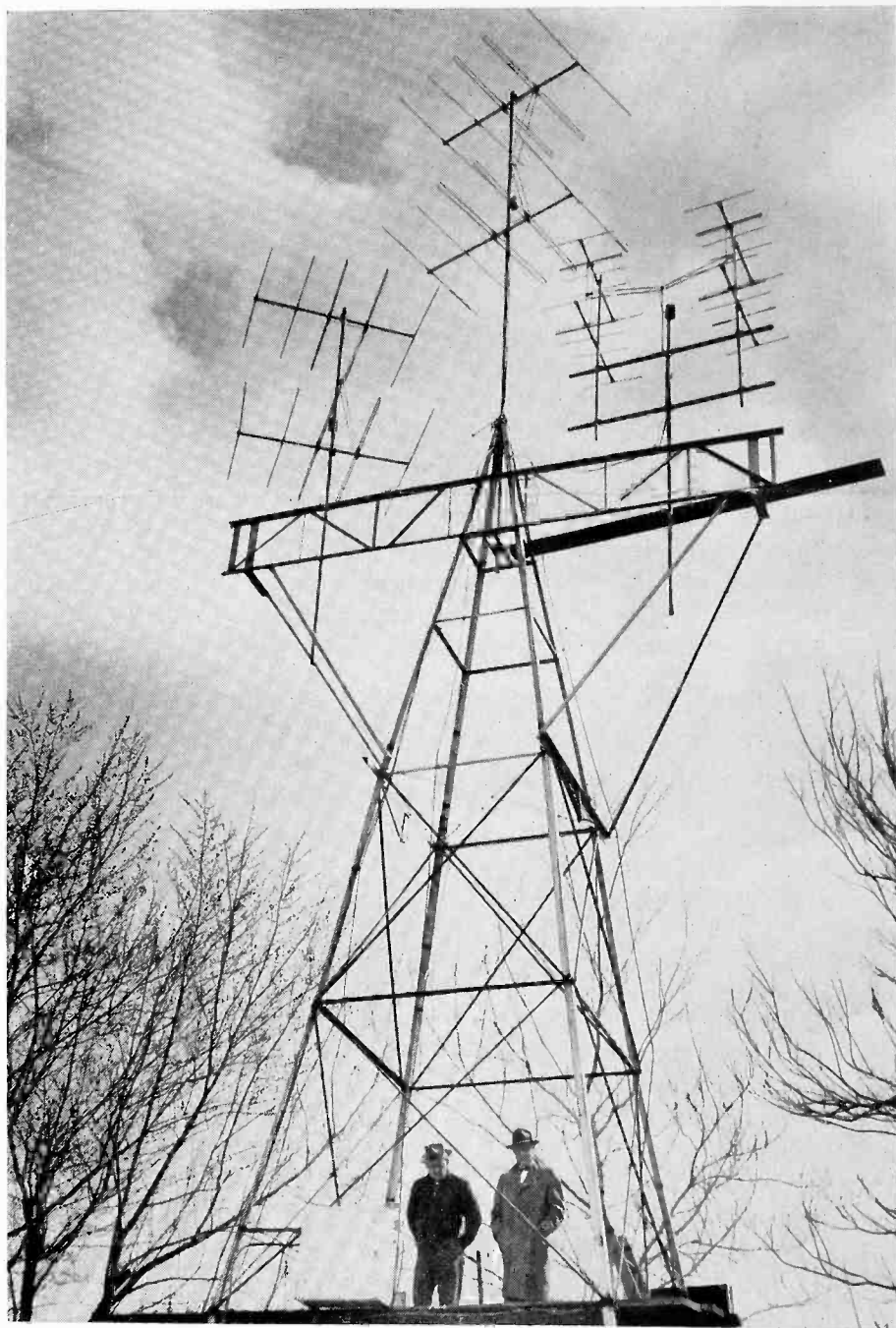


Fig. 1. A Community Antenna for Receiving Three Channels.

(Photograph by courtesy of Taco Antenna Co.)

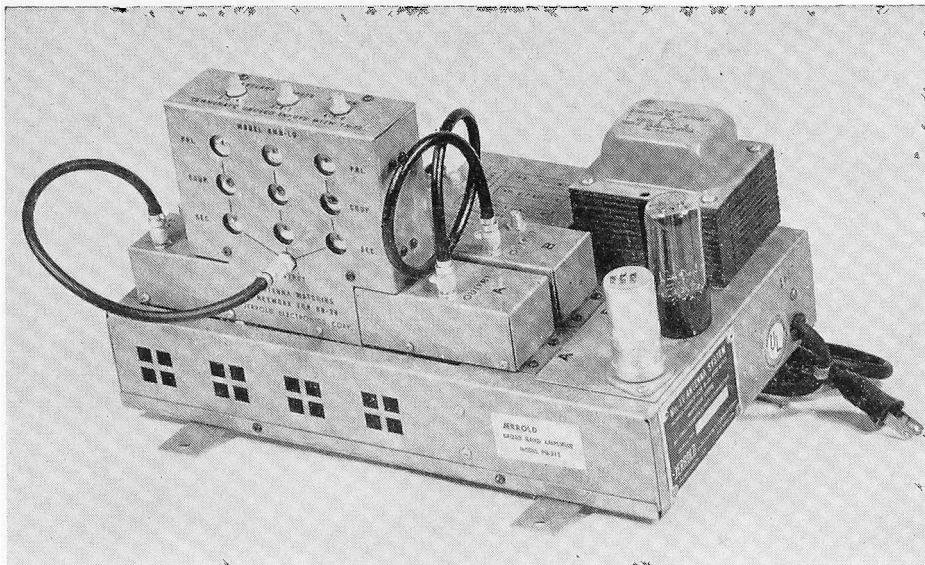


Fig. 3. Booster Amplifier.
(Photograph by courtesy of Jerrold Electronic Corp.)

At the present time the F.C.C. has not authorized the use of satellite television stations, except for experimental service. In some communities, therefore, such a distribution system may well be the only practical method at the present time whereby homes in lower locations can obtain satisfactory t v reception. Another advantage of such a system is that automatic gain control amplifiers may be used at the master antenna to compensate for signal strength variations which are very common in fringe areas. This would especially benefit the owners of relatively inexpensive t v sets.

Signals on the high band channels can be picked up at the master antenna and converted to an unused low band channel, thus avoiding the higher losses encountered at high frequencies, and giving more reliable service. In addition, the same procedure may be followed to convert the proposed u h f t v signals to an unused channel, thus enabling the t v set owner to obtain u h f service without requiring him to purchase an additional converter, and install a u h f antenna.

It should not be expected that a Community Antenna System is a cure-all for each and every fringe area t v problem. Two factors enter into the situation. First, the customer potential of the given community, that is, will the system

be feasible from a financial standpoint? Second, is an antenna location available which will provide the required minimum signal strength to give satisfactory t v service? (This minimum is about 100 microvolts).

Obviously, the signal available at the antenna must be such that the background noise is overcome and snow is eliminated. We cannot start with a poor picture at the master antenna and improve it by amplification, since the noise is also amplified. This minimum signal strength is not to be considered an average, but

rather the lowest signal strength received. Since the signal varies with time, it is necessary to check this over a period of time, preferably day and night continuously for at least a month or two, and consideration should also be given to the seasonal variations.

The success of such a system depends upon good initial service and uninterrupted continuation of this good service. At the start, the novelty of having television, even of poor quality, will sell the service, but after the novelty wears off the customers will demand higher quality pictures. Therefore, such a survey of the signal strength must be conducted preferably with some type of recording signal strength meter, and a t v receiver to check for ghosts, co-channel interference, and the actual picture quality. Then, if this indicates sufficient signal to enable satisfactory operation, the extent and layout of the system may be planned.

System planning involves routing the transmission lines to obtain maximum coverage for the investment while maintaining a reasonable balance of load on each line. Availability of existing poles maintained by public utility telephone and power systems can then be considered, and investigation made as to financial arrangements for their use. The



Fig. 5. Distribution Amplifier Mounted on Utility Pole.
(Photograph by courtesy of Taco Antenna Co.)

utility company will usually specify the method of stringing transmission lines and the methods of mounting components upon the poles.

At present, a t v distribution system is not considered to be a Public Utility, and hence is not subject to all the many restrictions governing public utilities, but this aspect may change rapidly.

Finally, a detailed plan of the system must be prepared, at which time the equipment costs may be estimated. For any given system these costs will vary somewhat, depending upon which manufacturer is supplying the equipment. Some manufacturers are able to furnish more extensive engineering and technical advice than others, and this may prove important in solving technical problems peculiar to such a system. This factor may also be important in routine maintenance and in having equipment modified to prevent its becoming obsolete, or to take advantage of improvements in circuit and tube design.

Since each system will be used under different conditions, there will be differences in the physical equipment. This is especially true of the antenna system and the amplifiers which precede the distribution system.

The signal strength available at the antenna location will determine the complexity of the antenna required. For example, if the system is to be used in an apartment house located in a strong signal area it may be possible to use a single broad-band antenna. If, however, the system is to pick up several t v signals, one of which is weak, or on the high band, it may be necessary to use separate antennas. Quite often a high and a low band antenna will be employed. In most community systems the available signal strength is rather low and it is necessary to use a high gain directive antenna, such as a Yagi, for each t v station. The Yagi is excellent for this use, since it is highly directive and can be constructed to have an extremely high gain.

In some applications, it is advisable to install a pre-amplifier directly on the antenna tower. For the high band antenna the pre-amplifier and a

converter are often mounted directly below the antenna. The high band signal is thus converted to an unused low band and fed to the master amplifier. This conversion at the tower reduces the losses in the coaxial cable run between the antenna tower and master amplifier. The same procedure would apply in the case of a u hf t v signal.

Master amplifiers fall into three general groups: All Band, High Band, and Low Band types. Here again the system requirements dictate the type to use. For an apartment system located in a fairly high signal area, the all band type would probably be employed, while the community system in a fringe area might require both a high and a low band amplifier. Typical master amplifiers use from three to five tubes; for example,

SYLVANIA Types 6BQ7, 6CB6 and 6AK5. They are used as grounded grid or conventional r f amplifiers. A common method of unit construction consists of a chassis containing the power supply and fitted with jacks into which are plugged the desired amplifier strips, which enables the unit to be used for either all band, high, or low band amplification, as required. An antenna mixing network is employed at the amplifier input to feed the signal from each individual antenna, provide antenna matching adjustments, and to eliminate ghosts due to mismatch reflections.

Automatic gain control amplifiers may be used with the master amplifier to compensate for variations in signal strength and to help compensate for changes in a c line voltage during

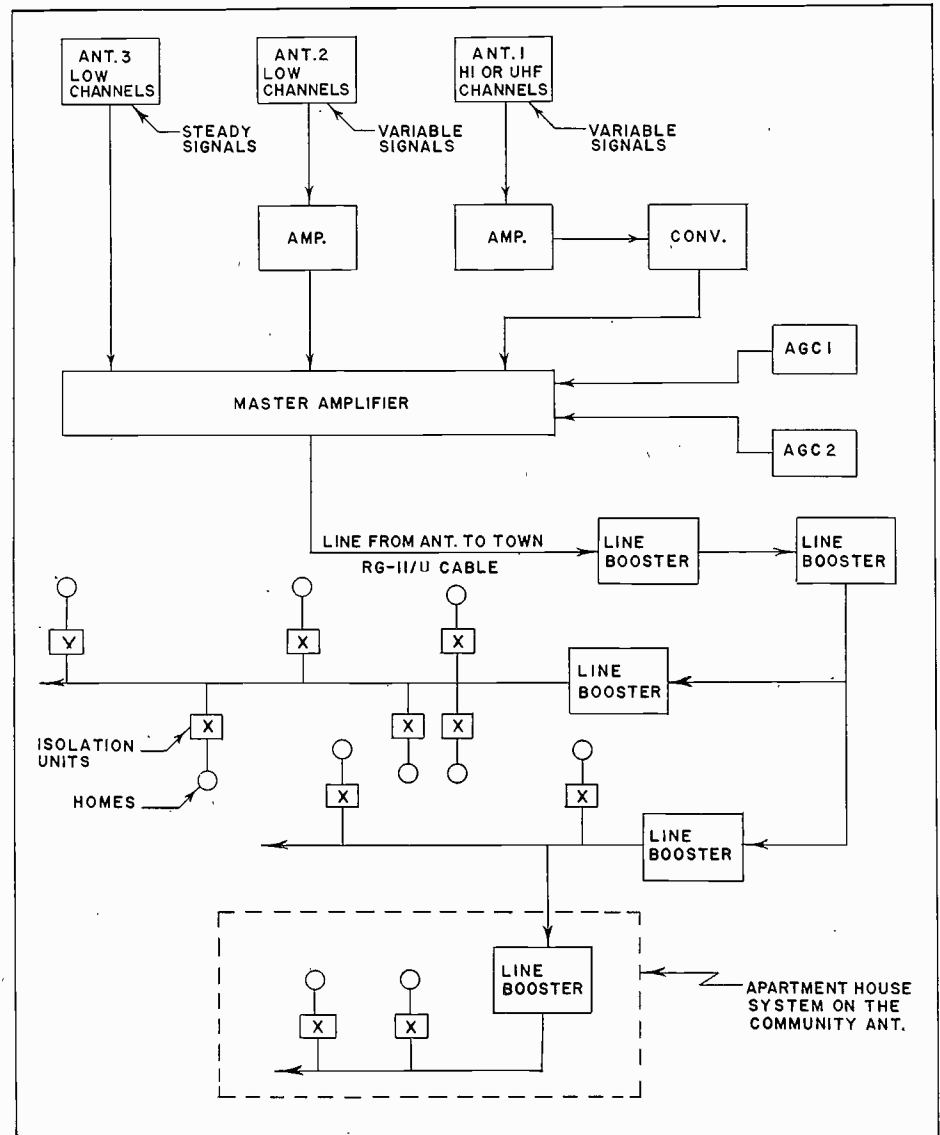


Fig. 4. Block diagram of a Community Antenna System.

peak hours. These a g c strips consist of an r f amplifier with a detector and a filter to develop a bias proportional to the signal received. This a g c control bias is then applied to the amplifier for that channel.

Coaxial cable is used in the distribution system, RG11/U being used in preference to RG59/U since it has lower loss per foot. It is possible to run well over 1000 feet of RG11/U cable before another booster amplifier is required (provided only low band signals are being distributed, since the high band is usually converted at the antenna as mentioned previously).

The construction of the booster amplifiers, which are mounted on the poles carrying the distribution line to the homes, is much the same as the master amplifier except that no a g c amplifier is used. Quite often the booster amplifiers are exactly the same as the master amplifier, thus enabling a maximum of unit interchange for maintenance with a minimum of spare equipment on hand.

For the short feeder lines to the customers' homes the cheaper RG59/U coaxial cable is sometimes used since the higher attenuation can be tolerated on these shorter lines. Units are employed at each customer's home to isolate the receiver from the feeder and to reduce the higher signal level present on the coaxial cable to a value which will not overload the t v set. Thus the length and type of coaxial cable feeding the customer's home will determine the value of the isolation unit to be used for each installation. Manufacturers of such systems have devised tables to help select the proper unit.

Adjustment of such a system must be carried out in a systematic manner, since too high a signal level on any one channel may cause overloading an amplifier resulting in cross modulation that can interfere with other channels. Likewise a mismatch anywhere from the antenna to the customer's set may result in reflections, ghosts, and unsatisfactory operation in general.

A large number of such systems have been installed in the New York

and Philadelphia areas for stores and apartment houses. The Community Antenna System finds its greatest application in hilly terrain such as in Kentucky, West Virginia, and in parts of Pennsylvania and New York.

Other states having community systems include Texas, Ohio, Oklahoma, Iowa and Wisconsin. This is not a complete listing since the number of such installations is steadily increasing.

Service Hints

GE MODELS 17T7-17C113, 17C115, 17C117 AND 17C120 TV RECEIVERS—Sound but no picture was the complaint. All high voltage tubes checked okay. Voltage on the 12SN7 horizontal oscillator plates was low and also the voltage on the vertical output (12AU7) plate, indicating that the B+ boost was not working.

Scope signals indicated that the horizontal oscillator was working and amplification was occurring at a reduced rate to the plate of the 25BQ6. Video information was good; so were sync pulses. I checked and replaced the selenium rectifier so that the rated current was present.

Then I changed the deflection yoke. In previous models, the yokes are in series; in these models, they are in parallel. In the former, the induction is additive; in the latter inversely proportional.

Not having the parts in stock, I connected the horizontal output coils in series to check and found high voltage present. Then I checked the coils and found one with shorted turns. One half had the required 45 ohms, the other 15.

When the collapsing field of the horizontal output does not have enough value, the horizontal output coil is not excited and the B+ boost is not present. To check this condition, approximately 220 volts should be present at the 25W4 damper and 370 volts at the cathode.—J. Nolters, Mahanoy City, Pennsylvania.

TO DETERMINE QUICKLY AND ACCURATELY WHICH TRANSFORMERS in TV sets are humming,

or are noisy, do the following: Roll an ordinary sheet of paper to form a tube. Apply one end of the tube to the ear and the other to each of the suspected transformers until the defective one is located.—L. Grashin, Republic, Pennsylvania.

SOME FOUR-YEAR-OLD 10" TV SETS apparently need new CR tubes because filament voltage is low. I found (in a Philco 48-100 series model) that the transformer delivered only 5.6 volts a c, which was too low to fully light the old tube. Using an old audio transformer core, with $\frac{3}{4}$ by $\frac{3}{4}$ window, I wound on 100 turns of #22 enamel, tapped at 88 turns. The beginning of winding goes to chassis; 88 goes to filament lead (cut where it comes out of chassis) of power transformer. The 100 turn lead goes to the CR tube. The results make the tube act almost like new.—D. V. Chambers, Upper Darby, Pennsylvania.

Editor's note: When using this hint, servicemen are cautioned against boosting to too high a value.

NOISY OR INTERMITTENT BAND CHANGING SWITCHES may operate properly after applying to the contacts a solution of vaseline and Bon Ami. The soft abrasive disintegrates in a short time and thus does not wear away the contacts. The vaseline acts as a lubricant and aids in getting the Bon Ami into the active parts of the switches. Thinning the solution with benzene also helps in reaching usually inaccessible contacts, as the solution can then be made to run down a pencil or wire to the proper spot.—W. H. Greenbaum, Elmsford, New York.



MERCHANDISING SECTION

NOVEMBER 1952 Vol. 19, No. 9

THE WORD'S GOT AROUND; IT'S SKYLINE FOR SERVICE IN CHICAGO HEIGHTS AND PARK FOREST

Park Forest and Chicago Heights, residential communities just outside of Chicago, are sold on the merits of television and the service of Skyline Television and Radio Service Company. For example, Park Forest, recently featured in *Pageant Magazine* as America's Model Community, is called "television town" because 85 per cent of its 4,500 homes have television. You may be sure that Skyline now services most of its TV and radio sets, too.

Only in operation since March, Skyline is a relative newcomer to Chicago Heights. But the ownership of the service operation—respected Dealers' Television of Chicago—has well established roots.

The top flight personnel of Skyline is comprised of World War II veterans. There is Ira F. Donham, Jr., manager, a graduate of American Television Institute of Technology; Robert R. Dehn, assistant manager, a graduate of DeForest Radio and Television School; Michael Marshall, field technician, also of American TV Institute of Technology; and Miss Shirlee Stein, secretary-receptionist, also a graduate of specialized training.

Staunch boosters of Sylvania radio and TV picture tubes, Skyline has won its success with good service at reasonable prices. The company has not failed to use plenty of Sylvania advertising material (both point-of-sale and direct mail) to help tell their prospects of how much they have to offer.

Skyline's brief but noteworthy history is worth examining.

Skyline doesn't mind showing off what it takes to service a TV set properly.



Skyline personnel: Robert R. Dehn at the wheel, Michael Marshall at the rear of the truck, Ira F. Donham, Jr. and Shirlee Stein looking on.

Join Sylvania's Christmas Gift Parade

There are not too many more shopping days until Christmas. If you haven't joined Sylvania's big Christmas Gift Parade, you will want to hurry. This terrific holiday program works like this:

1. Until December 31st, your Sylvania Distributor will give you one Premium Token when you purchase 25 Sylvania receiving tubes or one Sylvania TV Picture Tube.

2. Collect as many Tokens as you can.

3. Select your gifts from the impressive list of prizes shown below.

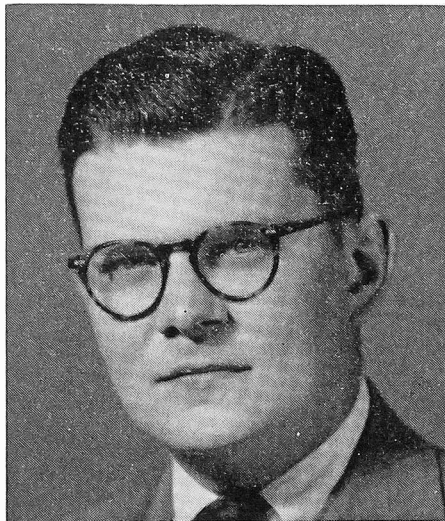
4. Fill in the official order form which you have received by mail from Sylvania and take it to your Sylvania Distributor with the required number of tokens. If you've lost your order form, you can obtain others from your Sylvania Distributor.

That's all you have to do. Your gift will come to you by mail about two weeks after you order.

(Continued on page 12)

LET THE MANUFACTURER HELP YOU!

By Bob Penfield, Advertising Manager, Radio and TV Tube Division



BOB PENFIELD

Manufacturers Help You Increase Sales and Profits with Business-Building Sales Aids

The part that manufacturers play in assisting TV Servicemen increase sales and profits through business-building aids stems from the fact that manufacturers recognize an important need of TV Servicemen. They realize that, as manufacturers, they can only *start* a sale. They do their part by creating and offering the starting tools. These are their business-building aids in the form of sales and advertising campaigns for the TV Service Industry.

These campaigns are professionally designed to make consumers *demand* more product and more service. They are designed to make it easier to increase sales and profits through increased demand. The TV Serviceman is not, therefore, considered as someone who merely buys goods and sells goods and service. He is backed up by the best that advertising skill can produce to tie him in with million-dollar promotion plans—if he will take advantage of the offers of leading manufacturers.

The TV Service organization that does not take advantage of these business-building opportunities simply overlooks an *easy* way to increase his business and his profits. He is avoiding the partnership that should exist between him and manufacturers. He is electing to do business the *hard* way. Alert and progressive TV Servicemen seek manufacturer cooperation. They are eager to find and *use* the point-of-sale promotion that leading manufacturers create for mutual benefit.

Cooperative advertising for TV Servicemen has never been produced by manufacturers out of mere kindness of heart. It is conceived, designed and produced to sell more goods and service by increasing *acceptance of the serviceman*. Manufacturers are the first to admit that their job does not include personal calls on TV set owners to sell and apply their products. But they do realize that they can help TV Servicemen do this job better. To do their part, manufacturers create better tools for TV Servicemen.

Progressive TV Servicemen recognize this. They take advantage of the interest shown by manufacturers that devote expensive TV program time to increasing respect and acceptance of TV Servicemen at the local and national level. TV program messages supplement attractive advertisements in national magazines with a "let-your - TV Serviceman - serve - you better" theme. The theme is extended by attractive window displays and counter cards that carry the sales message to the point-of-sale.

The sales message is also presented in the form of direct mail so that TV Servicemen can send it directly to their own customers *with their endorsement*. Their imprint promotes their share of new business created by the impact of a million dollar advertising campaign. All that the TV Service organization has to do is to request

the material from the manufacturer and pay actual postage cost—if government postal cards form a part of the promotion kit.

Manufacturers schedule cooperative promotion so that freshness of public appeal is maintained. Sylvania, for example, provides a continuous program that has been in operation for several years. Its theme and all point-of-sale material is redesigned and renewed to provide a completely fresh campaign four times a year.

A TV Service organization probably would gain recognition as an aggressive and successful business if it worked this one program fully to the exclusion of other plans by other manufacturers. However, most successful service operators, recognizing that continuity and seasonal appeal are important, generally do not put all of their merchandising eggs in one manufacturer's "basket."

They keep an alert eye peeled for all manufacturer's merchandising plans, particularly those that supply the brands of different kinds of parts that they feature. They survey manufacturers' offerings and customer wants, then they *select* the best merchandising plans in terms of seasonal opportunities in their own customer-community.

The most important thing, of course, is continuity of merchandising effort. This should be considered not only with respect to time, but also with respect to product brand. Part of a progressive TV Service organization's promotion policy is bound to be governed by recognition of the importance of *brand name* preference.

In addition to the maintenance of continuing programs of promotion through the selection and use of manufacturer's cooperative campaign material — TV Service operators usually have considerable room for improvement in the use of their

point-of-sale, the service shop.

Manufacturers offer many items that are necessary for day-to-day work. Fortunately for the TV Serviceman, the prices of these items reflect more of the manufacturer's cost than the retail replacement price. Business aids available to TV Servicemen at nominal cost or on a no-charge basis may be classified according to use as follows:

1. Professional Appearance
2. Display Materials
3. Tested Promotional Items
4. Remembrance Advertising
5. Time-saving Business Methods

A quick run-down of these five classifications that are always needed by TV Servicemen shows that *professional appearance* means more than a tidy shop layout. It means the package in which the serviceman presents himself and his associates to customers. Attractive shop coats assure a trim, professional look. They inspire customer confidence. And they cost very little, when they are purchased through leading industry manufacturers.

During home calls the service package is important too. Customers know that service is a *combination* of skill, tools and replacement parts. Tool and parts kits should be attrac-

tive. Give them a neat, professional appearance that is associated with camera, medical or other cases for professional instruments. This need not mean having a custom-built case made at high cost. Manufacturers, after careful study of the needs of servicemen, and the best cases that the market affords—will supply just what is needed and on a below-cost basis.

Attractive display material at point-of-sale means more than the use of window displays—which should be changed frequently to conform to the continuing merchandising program. It means the full use of counters and walls for merchandising cards, posters, streamers, easels, booklets and folders. These items are available from manufacturers, frequently on a no-charge basis.

Remember—it is up to the TV Service Organization to request and put these sales aids to work and to maintain a "good housekeeping rule." Sales aids and the over-all appearance of point-of-sale should provide a fresh, appealing atmosphere that almost whispers aloud "this is a good place to do business!"

During customer contacts make it a point to do more than a good service job. Leave something for your customer to *remember you by*. Suitable for this purpose are imprinted

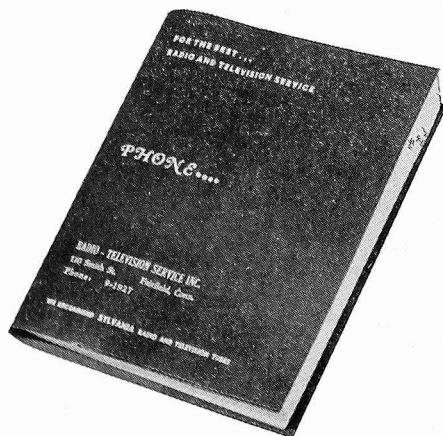
book matches, mechanical pencils, imprinted and informative literature, imprinted calendars and many other articles. Watch your mail for manufacturers' announcements of these inexpensive business builders. And remember—your manufacturer will get these for you wholesale.

Time-saving business methods interest manufacturers as much as they interest TV Servicemen. Efficient systems increase servicemen's sales by providing market data, and by acting as a recorder of the pulse of business conditions. They pay dividends in time saved for productive sales and service work. Manufacturers help solve these problems by providing systems for accurate, perpetual and understandable records. These systems greatly reduce the chore of keeping books. Look to the manufacturers' for simpler, more efficient accounting methods, and the forms that are best suited to your accounting needs.

Manufacturers help alert TV Servicemen solve the problems of change in the service market. They have to plan their own operations years in advance and can't afford to be caught napping in business transitions such as one from initial sales to replacement sales—but they need the TV Serviceman's cooperation—if full mutual benefits are to be realized.

NEW DEALER PHONE BOOK COVER

CONTINUALLY REMINDS YOUR CUSTOMERS OF YOU



Here's a business builder deluxe. The new Sylvania phone book cover, designed especially for radio and television service dealers, is a continual reminder to your customers of your business. Made of a fine simulated leather (durahide leatherette), the cover is a practical gift that will be appreciated by any of your customers because it protects and beautifies their phone books.

Imprinted with your business name, phone, and address, the Syl-

vania phone book cover will be seen by your customers every day, many times a day, for years. You'll get plenty of calls from this constant reminder. And that means more profits for you.

The covers come in either red, blue, green, brown, or black and include three lines of imprinting. Please specify color and imprint when ordering. Send all orders to Sylvania Electric Products Inc., 1100 Main Street, Buffalo 9, New York.

NEW ELECTRONICS BOOK

A Primer of Electronics and Radiant Energy is a new book by Sylvania Sales Engineer Don Caverly. It has been written to help the new radio and TV serviceman as well as the old timer. In an effort to learn quickly, the trainee often finds it necessary to skip through some of the basic and fundamental principles underlying the operation of radio—the physics of what happens and why. Here they are in simple, easily understood language.

Here is bedrock information on electricity, magnetism, electromagnetic waves as well as data on the most important types of electron tubes and equipment used in radio, television, radar, loran, sonar and many industrial processes. The new serviceman, or the man planning to become one will gain from the *Primer* a good foundation for his more advanced and detailed study.

For the established serviceman who

knows all the tricks of his trade, the book offers a chance for him to broaden the scope of his understanding of the basic principles of electronics, quickly and easily.

The book's 340 pages contain over 200 pictures, drawings and diagrams, and the four-color frontispiece is a chart of the complete range of radiant energy, from long wave radio to cosmic radiation, with all of the regions and their uses indicated at the correct frequency and wavelength.

A Primer of Electronics and Radiant Energy is available either at your Sylvania Distributor or through the Advertising Department, 1100 Main Street, Buffalo 9, New York. Because of this book's importance to the service dealer, the volume is sold at \$4.50—a dollar under the list price of \$5.50 at which it is being sold at all leading book stores.



Here is a car from which service calls are made in a four-state territory. Texas, Louisiana, Arkansas, Oklahoma—it makes no difference to Radio Red. He's out to give service. Notice that he sports a Sylvania Radio-Television Service Emblem. That tells everyone that he uses the best replacement parts. "I'm 100 per cent Sylvania since 1932," says Red.

Christmas Gift Parade

(Continued from page 9)

If you haven't begun saving Sylvania Premium Tokens, start TODAY. Let your purchases of Sylvania Tubes fill your Christmas stockings this year.

The big list of 33 prizes and the number of Sylvania Premium Tokens it takes for each gift follows:

3 pair Nylon Hose—8; Dutch Oven Chicken Fryer—9; Tackle Box—10; Woman's Gloves—11; Boxing Gloves—11; Doll—12; Ice Chest—14; Baseball Outfit—15; Carving Knife—15; Table Tennis Set—16; Steak Knife Set—16; Fishing Reel—16; Lighter—16; Doll Carriage—18; Fishing Rod—19; Desk Pen Set—19; Football Outfit—20; Table Lighter—20; Football—21; Golf Balls—22; Knife Sharpener—22; Pearls—23; Twin Dolls—23; Poker Chips—24; Rifle—28; Birthstone Ring—31; Sandwich Grill—32; Man's Wrist Watch—38; Woman's Wrist Watch—38; Electric Shaver—39; Camera—45; Deep Fryer—46; Blanket—48.

SYLVANIA NEWS

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Vol. 19, No. 9

NOVEMBER 1952

PUBLISHED BY
SYLVANIA ELECTRIC PRODUCTS INC.

MANUFACTURERS OF SYLVANIA RADIO TUBES, CATHODE RAY TUBES, ELECTRONIC DEVICES, FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, ELECTRIC LIGHT BULBS, PHOTOLAMPS, RADIO AND TELEVISION RECEIVERS.

In This Issue

NEWS

NEW SYLVANIA TUBE CARTON
REFLECTS QUALITY INSIDE

MERCHANDISING

IT'S SKYLINE FOR SERVICE
IN CHICAGO HEIGHTS
AND PARK FOREST

TECHNICAL

TV SIGNAL
DISTRIBUTION SYSTEMS

SYLVANIA NEWS

DECEMBER 1952



C. J. Lutten, editor
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Sylvania Electric Products Inc.
Vol. 19, No. 10

SUPERIOR PERFORMANCE OF SYLVANIA PICTURE TUBES NOW PROVED BEYOND ALL DOUBT

In recent tests conducted under the strict supervision of the United States Testing Co., Inc., Sylvania TV Picture Tubes were proved to outperform, out-last all others tested. Hour after hour for over 1,400 consecutive hours, Sylvania Picture Tubes were tested side by side with tubes of eight other manufacturers. The chart below tells the remarkable performance record. Note that only Sylvania Picture Tubes showed no failures. And in over-all point quality, Sylvania won over all other brands by a wide margin.

These important conclusions definitely place Sylvania Picture Tubes in the highest rank. They also mean the highest in trouble-free operation . . . better business . . . more satisfied customers for every service dealer who uses Sylvania Picture Tubes.

Mr. A. Mindes, U. S. Testing Co. engineer, supervised the above tests. He directed that eight tubes under each manufacturer's label were to be purchased—the majority of them in the open market at Los Angeles, Chicago, New York City, and Syracuse.

Tests were performed as follows:

1. Life Test 1400-1500 hours
2. Screen burns or blemishes
3. Slumping cathode emission
4. Increase gas content
5. Light output
6. Resolution
7. Spot Centering
8. Leakage
9. Voltage breakdown and Stray Emission
10. Ultimate usable life
11. Initial condition, appearance of bulb, unexcited screen, packaging
12. Cathode picture.

Each test category was given a designated point value. The points were totalled and averaged for the first week and each week thereafter until the tube had operated between 1400-1500 hours. Where the

At the conclusion of the exhaustive tests, the United States Testing Co. reported:

"On the basis of a performance evaluation on eight tubes of each brand tested, it can be concluded that the averaged qualities of the Sylvania tubes tested were superior to the averages of the others tested.

"The basis for this opinion lies in the following considerations on the eight Sylvania tubes tested:

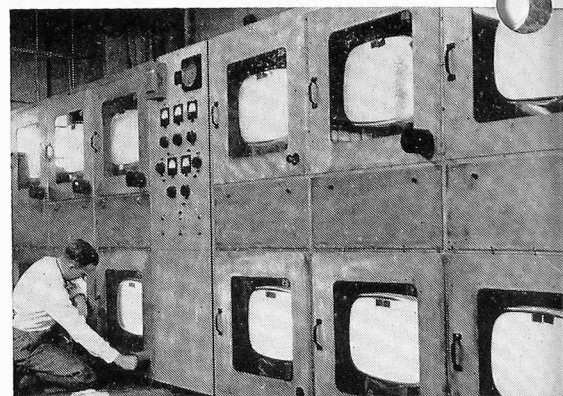
1. No complete failures
2. No excessive leakage
3. No excessive gas present
4. Excellent grid control
5. Excellent physical condition
6. Excellent spot centering
7. Good color control."

tube had failed early in the test run, point values were proportionately reduced.

Overall point values were determined for each type tested and for the manufacturers group as a whole.

When the tubes arrived at Sylvania, Seneca Falls, N. Y. (where the tests were conducted), they were stored unopened in a locked room.

| LIFE TEST MAGNETIC TUBES United States Testing Company Hoboken, N. J. | | | Test No. 1-5526 Date 10-11-52 Engineer A.S.M. |
|---|--------------|--------------|---|
| Mfr. | Tubes Tested | Tubes Failed | Point Quality |
| A | 8 | 3 | 76 |
| B | 8 | 4 | 79 |
| C | 8 | 6 | 62 |
| D | 8 | 4 | 74 |
| E | 8 | 4 | 67 |
| F | 8 | 5 | 42 |
| G | 8 | 4 | 52 |
| H | 8 | 5 | 30 |
| SYLVANIA | 8 | 0 | 93 |



All life tests were performed in racks like those shown above. These simulate actual operating conditions, but at accelerated voltages.

When the United States Testing Co. representative arrived, tubes were selected at random, physically examined for flaws, defects, chips, loose or cracked bases and the unexcited condition of the phosphor screen.

All the markings and identification were removed by (United States Testing Co., Inc.) and replaced by coded markings. The tubes chosen were immediately tested for emission, gas, color, spot centering, electrical and screen characteristics as outlined in Sylvania Quality Specifications for the tube types tested. After the initial tests the tubes were installed in Sylvania Life Test Racks (designed and built by Sylvania) which simulated actual operating conditions of a picture tube, but at accelerated voltages. The tubes were sealed in place to prevent tampering or jarring of the controls.

Electrical and screen characteristics tests (as made initially, with the exception of color and spot centering) were made daily for the first 100 hours, and weekly thereafter, until the tubes had operated 1400-1500 hours. Spot centering was checked only at the beginning of each test. Color measurements were made three times during the life test of each tube; initially, midway, and at the conclusion of the test run.

EXPERIMENTAL UHF TELEVISION STATION KG2XDU

SYLVANIA NEWS

TECHNICAL SECTION

DECEMBER 1952 Vol. 19, No. 10

William O. Hamlin, Technical Editor

By J. B. Grund - Advanced Application Engineer

This information in Sylvania News is furnished without assuming any obligations

Sylvania's interest in television transmission is two-fold. Primarily the interest is a technical one. It extends from research efforts to develop and improve products and enhance the service to their customers.

The engineers of the Advanced Application Laboratory of the Radio Tube Division at Emporium, in the pursuit of this interest, required the use of a radiated tv signal. It was felt that the development of tubes for u h f tv amplifiers, oscillators and mixers would be augmented. This would be true especially in the final stages of development when such tubes are being transferred from laboratory to pre-production stages, at which time a great deal of field work is essential. In addition, long-range operational reliability under widely varying conditions of use could be observed in the field rather than by the use of a simulated signal conveyed to the test apparatus by means of direct transmission lines.

Sylvania also felt that a station providing such a signal could provide information useful in implementing the interest of the Federal Communications Commission in extending television service as widely as possible. Sylvania believed that it would be in the public interest to investigate the feasibility of operating small unattended satellite stations to bring television to small isolated communities.

Heretofore, the most commonly accepted ways of supplying television service to isolated communities involved either establishing and operating a standard commercial station to cover the area or providing a community antenna system to pick up a signal from a television broadcasting station which was then distributed

throughout the community by a wiring system. The cost of establishing a commercial station and providing and maintaining complete programming facilities apparently precludes this possibility to all but large, urban areas. On the other hand, the wired-in system offers advantages to a community in both cost and program quality. The installation cost is high and the maintenance required usually results in a substantial subscription fee.

Sylvania felt that a satellite station would offer the same national entertainment as available to urban areas with a low initial and long-term maintenance cost. It was believed that Emporium would be an ideal location for investigating the possibilities of satellite stations since it is a small community bounded by hills that rise to over 1,000 feet above the community proper. Regular television reception in the community itself is substantially impossible because of the remoteness of the community from commercial television broadcasting stations and because of the high hills entirely surrounding the community. On the other hand, the high hills do make it possible to directly receive on the hilltops satisfactory television signals from one or more television transmitters at distances of nearly a hundred miles from Emporium.

An experimental relay station in such a location would permit observation of transmission characteristics peculiar to u h f signals over a mountainous area together with observations of day and night signal strength variations, seasonal variations, the effect of tree foliage, etc.

Subsequent to the issuance by the Federal Communications Commission on September 19, 1951, of a con-

struction permit for an experimental station, Sylvania's Application Engineers constructed station KG2XDU which they believed was ideally suited to satellite station performance. The original construction permit contemplated an experimental station operating on the ultra high frequencies of 509 to 529 megacycles but, however, limited picture transmission to test pattern only and sound transmission to tone or voice for testing and identification. While these conditions provided a test signal which proved of value to tube and circuit development, they did not permit adequate investigation of the possibilities of

(Continued on page 8)



J. B. GRUND

Mr. Grund is a member of the Advanced Application Section of Sylvania's Commercial Engineering Department at Emporium, Pennsylvania. He joined Sylvania in 1948 after receiving his B.S. degree in Electrical Engineering from the University of New Hampshire. At present, he is working primarily with Station KG2XDU and on u h f propagation problems. Mr. Grund holds an amateur radio operator's license, with the call letters W3RLH, formerly WILSY.

SYLVANIA PICTURE TUBE SCREENS

By P. M. Reinhardt - Technical Publications Section

To gain a better understanding of the problems involved in the production of Sylvania's high quality picture tube screens, let us examine the factors involved.

Light and Phosphors

The screen itself is composed of a material called a phosphor, which will emit light when bombarded by electrons. There are many types of phosphors which differ in color, persistence, efficiency, etc. The one of particular interest in tv picture tubes is designated P4, has a white color, and a medium persistence. These tubes are recognized by the P4 suffix on the tube type designation, e.g. 17BP4, 21EP4, etc.

High Purity of Chemicals

One of the most important factors in the manufacture of Sylvania high quality screens is the extremely high purity of all the chemicals and water used in the process. It is of interest to note that a minute amount as 8 parts per BILLION of copper will contaminate the screen sufficiently to cause a noticeable change from pure white to a greenish screen color. All the chemicals which go to make up the screen are tested over and over again to ensure this purity. Even the water involved in the manufacturing process is deionized to remove the possibility of contamination. This deionized water is even more pure than water which has been distilled SEVEN times.

The tanks, containers and piping which handle the liquids used to apply the screen are all of either stainless steel, or plastic (Figure 1). The piping joints are not caulked in the usual manner, but are rather stainless steel welded to prevent contamination. The use of a single brass screw or ordinary pipe joint filler could introduce sufficient copper to render a whole day's production useless!

The actual mixing of the screen solutions is done by a special metering pump, which is completely automatic, thus eliminating any possibility of human error. In addition, every half hour a double check is made on the solution to provide the same carefully controlled, uniform solution consistency. This storage and preparation of solutions is done in a tile-lined room specially designed by Sylvania engineers and chemists to ensure the purity of the components used in screen processing. Before these carefully prepared solutions flow out of the solution room through the stainless steel piping, they are again filtered through large Alsof filters as another check against any impurities getting into the final screen.

Screen Dispensing and Initial Drying

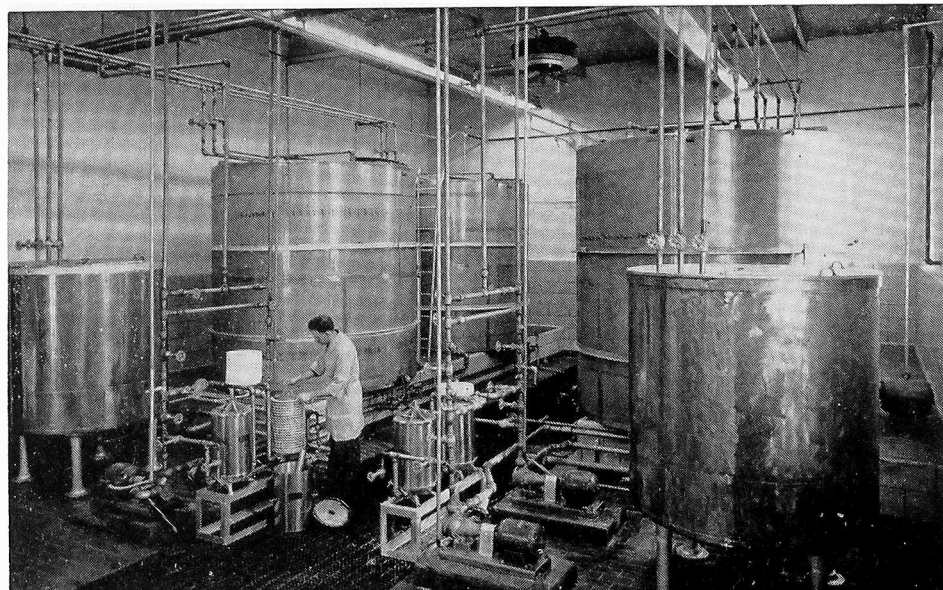
One of the most important processes in the manufacture of tv picture tubes is the dispensing of the phosphor particles on the face of the bulb. The glass bulbs have undergone

a large number of operations to prepare them for screens. Among other operations, they have been annealed for hours to remove any residual stress in the glass, washed in a huge rotary washer with a solution of hydrofluoric acid, rinsed with deionized water, washed with a hot caustic solution and finally rinsed several times with more deionized water. This removed any possibility of screen contamination from the glass of the bulb.

The bulbs are now placed on another conveyor belt which is wide enough to carry rows of three bulbs abreast. This conveyor was specially designed for minimum vibration and is constructed of heavy welded steel beams secured to a massive concrete base. As the belt moves, the necks of the bulbs appear in slots on a raised platform at a "filling station" where the screen solutions are injected into the clean bulbs. The operator of each station tends dispensing equipment for three bulbs at a time. Above the operating position are transparent plastic reservoirs to supply each bulb. These reservoirs are filled automatically by electronically controlled devices with exactly measured amounts of solutions. Here again the solutions pass through filters to guard against impurities. Transparent flexible plastic hoses run from the tanks to long nozzles which are inserted into the bulb necks by the operator. Transparent reservoirs and hoses permit constant visual inspection for cleanliness and continuity of flow. During regular electronically-timed intervals, closely measured quantities of each solution drain from the reservoirs through the plastic hoses into the slowly moving bulbs. The intricate electronic timing system guarantees that each bulb receives exactly the correct amount of the solutions, thus ensuring a consistent, uniform screen for each and every bulb.

When the flow of solution is automatically stopped, the operator

Figure 1. Solution Room—Alsof filter being serviced, with metering pump in center foreground.



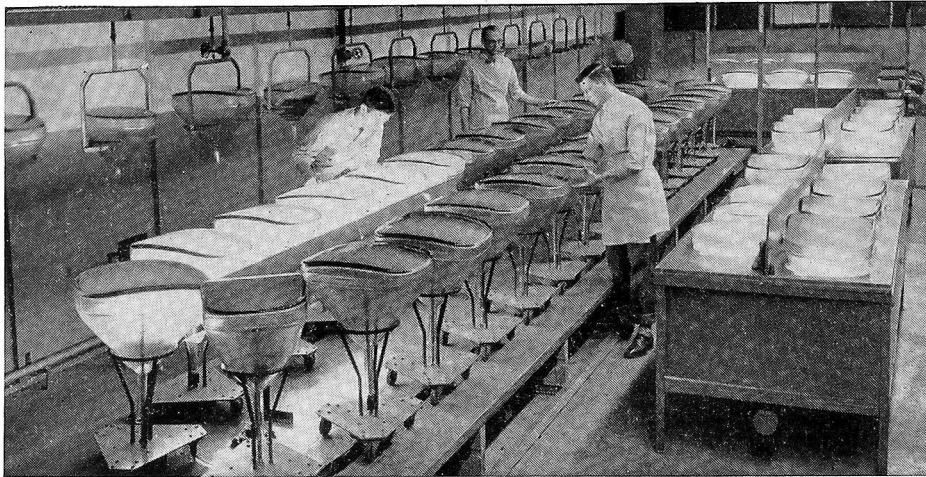


Figure 2. Screen Drying and Inspection.

removes the nozzle and places it in its standby holder, which is a wash device that sprays pure water over the nozzle to keep it clean and ready for the next injection. The bulbs containing the screen solution travel past the filling station along the conveyor. As they slowly pass along the vibration-free belt, the phosphors settle to the inner face of the bulb and adhere to form a very accurately controlled, uniform screen of the desired density. The solutions remain in the bulbs a predetermined time and then are slowly and carefully poured out automatically at the end. The bulbs continue on the conveyor to the lower level where warm air is gently blown into each bulb to dry and set the screen.

Screen Drying

The bulbs are now removed from the screen dispensing conveyor and placed, screen up, on another specially designed and built conveyor for inspection. The bulbs pass a specially lighted inspection station where the screens are carefully examined by a well-trained, experienced inspector under the supervision of lab engineers (Figure 2). After this inspection process, the black internal coating is applied.

Screen Baking

The screen, internal coating and bulb are now baked in what is probably the largest "oven" in the t v tube industry—a huge 105 foot long, gas fired, radiant tube lehr. The conveyor belt of the lehr is 12 feet wide, and can thus handle rows

of six 21" bulbs at a time. The bulbs travel for a number of hours on this conveyor belt through heating zones and one graduated cooling zone. The bulbs are slowly and evenly raised in temperature and then gently cooled so that they may be immediately handled at the other end of the lehr. The complicated control panel automatically and continuously keeps records of all temperatures at all times, 24 hours a day.

As the bulbs are removed at the end of the lehr, they are again inspected, this time under ultraviolet light to check the uniformity and fluorescence of the screen.

Further Screen Testing

The screened bulbs are now ready to be sent to the mount sealing machine, where they will have the carefully engineered Sylvania electron guns sealed into the neck. They then proceed to the giant exhaust machine line. Each of these processes contains many interesting details, but that is beyond the scope of this

article on screens. To cover each process at this time would result in several volumes, rather than a single article!

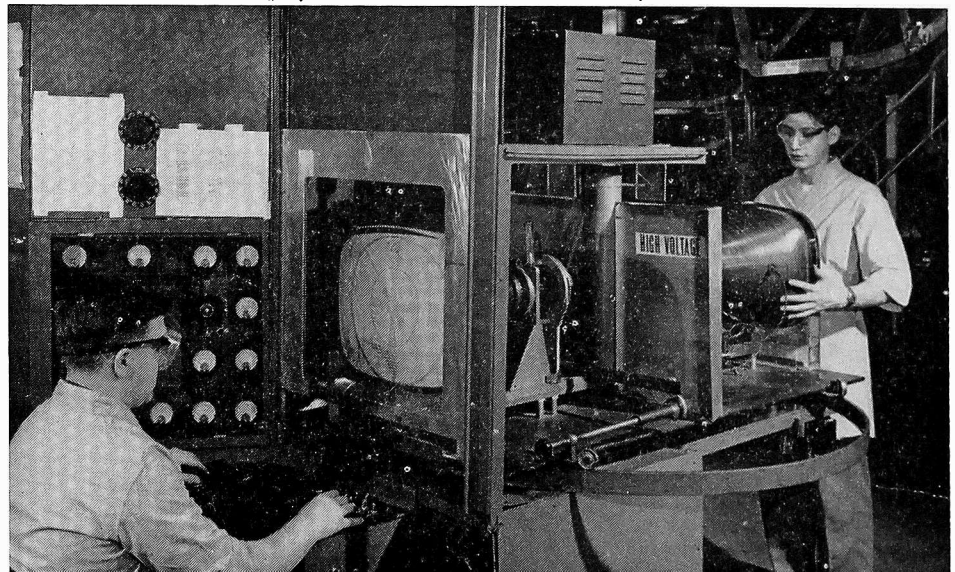
The screen undergoes many more tests now that it has become a working part of a t v picture tube. A few of many are listed below:

- Contrast Range
- Screen color
- Brightness efficiency
- Light output
- Definition-resolution
- Screen perfection and uniformity in a physical sense, as well as electrically.

One of the more interesting group of tests is performed on a large Sylvania-designed rotary test set where the tube is not only operated with all the voltages required, but each and every tube is tested while it displays a standard test pattern (Figure 3). This test pattern is of the same type used by all t v stations. Thus the tubes are tested in the manner in which they will be used—with a picture on the screen. This test also includes a large number of other checks on the rest of the tube; gas checks, mechanical alignment of base and pins, emission, high voltage breakdown and many other factors.

In addition, life tests are conducted continuously on production lots of each type. These tests are conducted not only under actual test pattern conditions, but also at extreme conditions far above the normal requirements. Such tests prove that the processes are resulting in the best quality t v picture tube on the market, the high quality Sylvania Picture Tube.

Figure 3. Testing Sylvania Picture Tubes—note the pattern on the screen.



EXPERIMENTAL UHF

(Continued from page 5)

satellite operation. Therefore, the restrictions were removed by the Federal Communications Commission so that unattended satellite operation of KG2XDU in retransmitting the program material as received from WJAC-TV, 88 miles away, could be

carried out. Thus the way was cleared for practical day to day observation to determine the feasibility and reliability of such satellite operation.

Plans are also under way to operate a second station KG2XEL on the ultra high frequencies of 778 mc to 884 mc (Channel 82) at a different location within the community itself so that comparative tests can be made

at or near the two ends of the u h f television bands and also to investigate the relative advantages of two different systems of operation; that is, the first station directly radiates the signals down into the valley from the hilltop location, while the second station located in the valley will operate on signals relayed from the hilltop location and thence reradiate them within the valley area.

Service Hints

AIRLINE TV—MODEL 05 GSE 3020—Weak sound, but picture normal. Condition was corrected when replaced leaky 10 μ f electrolytic between pins 2 and 7 on 6T8. On same model, no vertical sweep was found to be due to leaky capacitor C 71, which changes grid voltage on 6SN7 vertical oscillator. Absence of sound on this model may be caused by C 41 (0.05 μ f capacitor) shorting.—George's Radio Service, Santa Ana, Calif.

WESTINGHOUSE TV RECEIVER H629K16: The picture lost its horizontal synchronization and was negative or reversed. The horizontal width control coil was open. Resistance of this coil should be 100 ohms. It was recommended that the horizontal output tube, 6AU5, should be replaced, since this tube broke down a few days later, after a new width control coil was installed.—Andrew Malan, Long Island City, New York.

RCA 7T103 TV—The set in question had loss of sync and intermittent loss of high voltage. All resistance and capacitances checked within 10% of their specified value. The trouble was caused by an arc from the damper filament winding in the power transformer to the core. Substituting a filament transformer for the damper winding proved our suspicions, and installing a new power transformer cleared up the trouble.—FOREST PARK RADIO CO., Springfield, Mass.

REFLECTION AT CERTAIN VIEWING LEVELS, from Motorola TV sets which have the curved "Safety Glare-Guard" lens may be removed by inverting the lens. When the sets are placed on a high shelf, above eye level, lights or daylight from nearby windows, may concentrate annoying reflection at certain viewing positions. By removing the chassis and inverting the lens, the reflections are eliminated, whether the sets are then placed at a high level or below eye level.—F. Zampelli, Lewistown, Pennsylvania.

TUBE PULLER: A simple substitute for the commercial tube pullers on the market may be devised by removing the rubber boot from an old car radio vibrator. A variety of sizes can be obtained by selecting different size vibrators.—R.M. Spicer, Arcadia, Calif.

INTERMITTENT HORIZONTAL HOLD—Customer usually complains that he has to get up to readjust front panel knob immediately after once adjusting, though it sometimes stays in sync quite awhile. I traced this trouble to the .002 grid coupling capacitor. By replacing this component (whether it checked all right or not) with a capacitor of known high quality, set worked properly. This note applies to AIRLINE TV model 94 WG 3006, 94 WG 3008, 94 WG 3009, 94 WG 3028, 94 WG 3022, 94 WG 3029, 05 WG 3031A.

IF COIL FREQUENCY: Here's a little stunt I use to find the frequency of i f coils. I use a signal generator on the primary and a VTVM connected across the secondary. Then, by rocking the signal generator, I can find which frequency yields a reading on the VTVM.—Robert Bair, Hood River, Oregon.

(Editor's Note: In this case, the VTVM would have to be used as an a c meter. This technique would allow only general approximations—such as separating 175 kc, 262 kc and 455 kc i f's—because of slight detuning effects.)

DETENT SWITCHES ON THE RCA MODEL 121 TV RECEIVER—While working on this and other model t v receivers which have detent switches, I have frequently noticed that the ball bearings fall out of the switches. This occurs when the bearing or bearing groove becomes dry and a small piece of lint or grit lodges in the switch. My remedy is to apply a dab of vaseline to the ball bearing and groove with a toothpick. As these switches do not come with any extra lubricant supplied, it would be wise to apply some to detent switch replacements.—J. P. Torre, New York, N.Y.

MOTOROLA TS-89—After replacing the deflection yoke (because the vertical winding was shorted), I noticed the sound had a buzz—which I thought was a sync buzz. I put a shield over the 6J5 audio amplifier tube and the buzz disappeared.—J. M. Lopez, Long Island City, New York.

SYLVANIA WINDOW DISPLAY PLUGS YOUR SERVICE BUSINESS

Thousands of New Yorkers and out-of-state visitors passed by a window in the 247 Park Avenue building arcade last month. In the window was a display that gave readers a quick education in what it takes to service a television set, and a plug for the service dealer who displays the Sylvania Radio-Television Service Emblem. The window was prepared by Sylvania; space was donated by the advertising agency Cecil & Presbrey.

The cards making up the displays



Service dealers interested in preparing a similar window to give their townspeople a clear view of the service business can take a few tips from the above. Printed cards, a TV chassis, a few receiving and picture tubes attractively arranged in your window will go far in creating good will for you with the TV set owner.

called to the viewer to remember that "when your TV set needs service—and even the best set does occasionally—look for this sign and get the job done right." The sign, of course, was the Sylvania Service Emblem.

Continuing cards read: "The man at this sign uses up-to-date Sylvania test equipment. He uses up-to-date Sylvania repair equipment. He has Sylvania picture and sound tubes—

all you need to do is request them. He is equipped to repair your radio right, too!"

Other messages were: "New Sylvania Picture Tubes are completely guaranteed a full year after installation. Sylvania Radio Tubes are used by leading air and ship lines. Seven of the top ten set manufacturers use Sylvania Picture Tubes as original equipment."

Business Bureau Would Bar "\$1 Per Call Plus Parts" TV Ads

The Better Business Bureau of New York City has recommended the discontinuance of all advertising of specific prices for television service such as "\$1 per call plus parts" and the elimination of "free estimate" offers. It also cautioned that all advertised guaranties of service must be specific as to duration and actual terms.

The bureau reported an increased number of complaints from persons using television service advertised as costing "\$1 per call plus parts," as well as other specific price claims for service.

Investigation showed that in the majority of cases unnecessary parts or tubes were sold, work was overcharged, or both. The bureau quoted members of the trade as saying that the profit on tubes and parts was not sufficient for them to guarantee the work and stay in business and that

adequate labor charges on a time basis were necessary.

It was pointed out that the "\$1 plus parts" type of offer leads frequently to a bigger expenditure than would be otherwise necessary.

The bureau also felt that some advertisers have sought to meet such competition by "free estimate" offers. Such offers can be made good only when the necessary repair is a simple and definite one which can be made in the home. Otherwise, the total charge depends on the time necessary and the number and kind of parts needed, which can be determined only by doing the job itself.

Specifically the bureau recommended to all TV service advertisers and advertising media the following: No prices should be mentioned; free estimate offers should not be used; warranties should be specific as to duration and actual terms.

September TV Set Production Increased By 124 Per Cent

Production of television receivers in September increased 124 per cent over the industry output in the corresponding month of 1951, according to RTMA's estimates. The radio receiver output, however, dropped considerably under last year.

The RTMA report for September, a five-week period, showed the manufacture of 755,665 television sets as against 337,341 units in the same month of last year. The radio output was estimated at 865,654 sets compared with 1,100,246 units in September 1951.

Totals for the first nine months of 1952 showed 3,670,591 TV sets and 6,689,535 radios manufactured.

Home sets with FM facilities totaled 21,507 units in September. In addition 7,664 TV sets with FM circuits were produced.

TV SERVICE ARTICLE PROMOTES GOOD DEALER-CUSTOMER RELATIONS

In a recent issue of TV Guide, which reached over 425,000 families in the New York and Washington areas, there appeared an article written by John D. Burke, a practicing TV serviceman. The appearance of this article, and others like it, are heartening to Sylvania. These messages reinforce the job Sylvania has long been doing so successfully in popular magazines and over television—promoting good service dealer-customer relations.

Sylvania has continually warned the set owner never to explore the inside of a TV set. Repeated often enough, set owners come to understand that when something goes wrong with their equipment they should call a qualified television repair technician.

Burke's article *Don't Fix Your Own TV Set* follows:

"Television repair *seems* easy. But the truth is that 90% of the troubles in television sets you *cannot* fix yourself.

"Let's take *tubes*. You think your trouble is usually a tube. About half

the time you do have a bad tube. But only 10 % of the time is the bad tube cold. Tubes can be defective and still light up. In the end, it can cost you more money—and even your life.

"Small tubes in television sets have many different jobs to do. Did you know that more than 110 different types of tubes have been used in television sets?

"*Picture lock*—your picture holding steady—depends on both the transmitted signal and on your set working properly. You could have a bright picture tube, perfect sound, everything—except the lock. Often the trouble in such cases is not a tube. It may be one or more of the hundreds of tiny parts under the chassis.

"I am plenty mad at those books which tell you to turn all the screws. Sometimes it works. Turning just the right screw, a little bit. But most of the time you just make more work for the repairman when he comes.

"The electric charge remains in the set after you turn it off. We mechanics always discharge the high

voltage circuit components before we touch them. How high is high voltage? In big tube sets it runs 15,000 to 20,000. Watch out.

"Some of the books tell their readers to take a pencil and go tapping around tubes with the set turned on. Oh, brother, what a shock you might get. *You could get killed!*

"Most people have heard about the high voltage used in television sets. So by trying to avoid shock, they imagine they are safe. Brother, you are not safe. I am not talking about shock. I'm talking about explosion. The big tube. Haven't you heard?

"You've heard light bulbs pop? That's just a fire-cracker compared to picture tubes. Imagine what will happen if your picture tube were struck, or rapped sharply, or strained unduly by you. Is it worth your life to save a few dollars?"

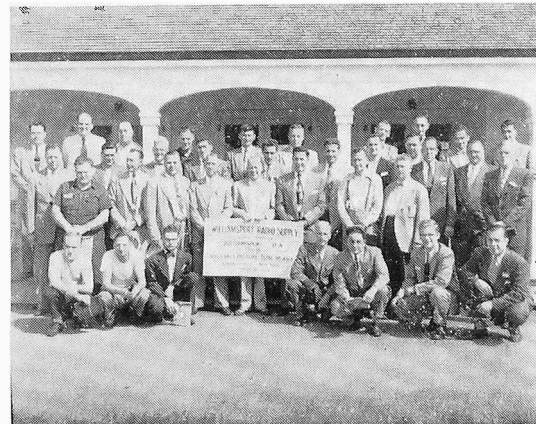
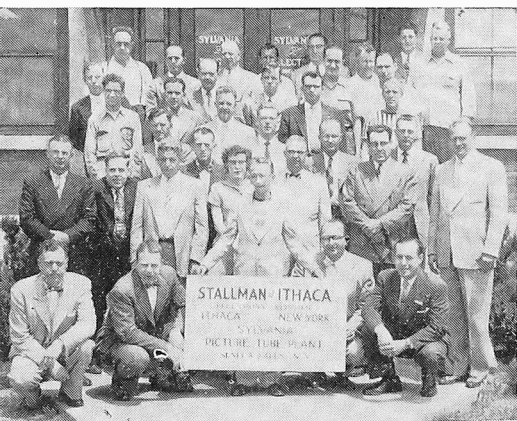
SERVICEMEN SEE HOW SYLVANIA BUILDS QUALITY TV PICTURE TUBES

Five groups of service dealers, guests of their respective Sylvania Distributors, have recently visited Sylvania Picture Tube plants in Seneca Falls, N. Y. and Ottawa, Ohio. They saw how Sylvania builds quality picture tubes.

These service technicians were able to see Sylvania's skilled workmen in modern factories equipped with the latest mass production equipment. Their trip proved to them that Sylvania Television Picture Tubes have quality "built-in."

Pictured are the groups that visited Sylvania's Seneca Falls plant; at bottom right: guests of Williamsport (Pa.) Radio Supply; at left: guests of Dymac Inc. and Genesee Radio Co. (Buffalo, N. Y.), the Stallman of Ithaca (N. Y.) group.

At top right is a group of service dealers who were guests of Commercial Sound & Radio Co. (South Bend, Ind.) at Sylvania's Ottawa plant.



SPRINGFIELD, ILLINOIS SERVICE CENTER

Auto Radio Servicing Is a Real Profit Maker for Capitol Radio Shop

"Many servicemen look on automobile radio repair work as a profitless pain in the neck but we've made it a very good revenue builder and have worked it out as very profitable for our own business," according to Bill Bryant of Springfield, Illinois. Bill's a partner with Glenn Mrasak, now with the armed services in Korea. They own the Capitol Radio Shop, 420 North First Street, Springfield.

The partners do better than 80 per cent of the automobile and small set service business in Springfield, one of the local jobbers told us. The city has a population of over 80,000 so that's a worthwhile business.

Bryant explains, "at least seven out of ten service shops avoid this type of service business as if it were a plague of some sort. They seem to think there's no way it can be done with real profit.

"Where such a source of business existed we felt there was a good opportunity—if we could solve the problem of handling it profitably. We have.

"We started by getting the warranty business of every new and used car dealer in town. There's really no way this can be made profitable in itself and we never felt that we could make it so. In our opinion it was a big opportunity for advertising.

"If you stop and think of how much it costs any service shop to get a new customer you'll realize how inexpensive this advertising can be. When, in addition to capitalizing on its advertising value, you can make it profitable business, then it's one of the best fields you can get into."

Mr. Bryant has been in the business for 16 years and in the present

partnership since the end of World War II. The automobile radio repair business was one of the first fields they went after.

"It didn't take us long to line up the warranty business for every make of car radio," he recalls, "because other shops had been avoiding this business. We soon found out that our hunch was correct. Specializing in and pushing this business brought us a terrific amount of leads to other service business that it would have taken us a long time to get otherwise."

A charge of \$1.50 is made to pull out and put a set back into the car and Bryant says customers have never objected to the charge. Sets are never pulled out unless necessary to do so. A check is made to see if trouble lies in need of a new fuse or tightening a bolt. Where this happens the service is free. Bryant says doing this has made many loyal customers.

"We make good profits from auto

radio repair work because of our basic pull out charge," he explains, "and because we follow a few simple rules in doing this work.

"You must treat the customer's car as if it were your own and never pull out or install a set in dirty clothes. We never take a set out of a car parked close to another customer's car. The reason is that you have to open the door and keep it open to do your job. When you do it may bang against and scratch the paint on the car next to it—something the other customer isn't going to appreciate.

"We've also found that it is good business to have the customer watch you while you're doing it. He can then see the care and attention you give the job and appreciate it."

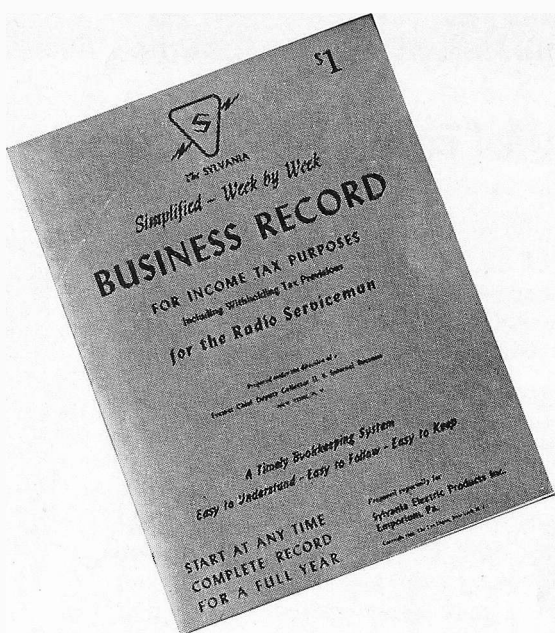
Another reason why Mr. Bryant believes that car radio repair business

(Continued on page 12)

Capitol Radio Shop believes in showing its customers the service they are paying for.



USE SYLVANIA'S BUSINESS RECORD BOOK IN 1953, ESPECIALLY DESIGNED FOR SERVICE DEALERS



It won't be long before everyone will start thinking about filling out income tax returns. If your business records have been kept in a sketchy manner, you know the headaches you are going to have by March 15th. To avoid that sort of thing in 1954, why not start off 1953 using Sylvania's Business Record Book. The book, available at \$1.00 from your Sylvania Distributor or from the Advertising Dept., 1100 Main Street, Buffalo, N. Y., is the easiest way to record your business activities. It was designed especially for servicemen by a former tax expert.

The Sylvania Business Record Book provides a complete record for a year. It helps keep account of the merchandise purchased, the salaries paid, money received and the cost of doing business.

The book is arranged in two parts. Part One includes a record of daily income for a month, weekly expenses for the month, personal drawings, payments on notes, fixtures and equipment and a cash balance sheet for the month. Part Two provides a record of payments for merchandise and a record of money paid to employees for their services.

Let's look at each section of the record separately to see how it fits into the service business. The daily income record is a simple account of money received for merchandise or service. The receipts for each day can be entered in a few minutes from job record cards and the cash box total.

The week by week "Record of Expenses" shows how much is paid out for overhead expenses such as supplies, rent, repairs, electricity, gas, telephone, insurance and other items which are necessary for operation but which contribute nothing to the income of the business. Generally these items can be deducted from income taxes as legitimate cost-of-doing business items.

Personal drawing for salary to the owner or the partners of the business are recorded in the special portion provided in the Sylvania Business Record Book. Here is an accurate account of the money paid to owners of the business. This record is important because it must be clarified on income tax returns.

The column, "Payments on Notes, Fixtures & Equipment" is a record of money paid for material purchased on an installment plan or money paid to a bank for money borrowed. In general, entries in this column are for capital expenditures—expenditures, which add to the value of your business. Interest on money borrowed from a bank, or paid on the purchase of equipment should not appear here, but in the "Expense" record under "Interest."

In the "Cash Balance for Month" column there is a condensed picture of the financial standing of the business for the month. This column will show what financial progress has been made and where the weak spots of the operation were for the month. This record helps to keep expenses in line and helps increase profits.

Part Two of the monthly record shows how much money was spent

for merchandise during the month. This should only include money paid out for merchandise which later re-sold. It does not include the payment for merchandise which is used in normal business operation such as speaker cement, wire, and other material not chargeable directly to the customer.

Here too, is a record of payments made to employees, as salary and wages. This record also includes the amount of money withheld for Old Age Benefits and Income Tax collected for the Government.

There is a complete record like the one described above for every month of the year. Each month is an individual record which shows the financial picture in complete detail.

To complete the yearly financial record, The Sylvania Business Record Book contains a yearly "Profit and Loss Statement." From the material gathered during the year, this statement can be prepared with little difficulty. This statement shows the condition of your business at year's end and is a good indication of how well you did and where the weak spots are.

The book also contains many helpful suggestions for determining your income tax. It shows how the forms should be prepared and tells what each item in the tax form stands for.

Business records are essential to any business. Through adequate records of yesterday, there is better planning for tomorrow. The Sylvania Business Record Book offers an economical system for keeping records of expenses and profits. The cost of the book is \$1.00. No matter whether you do \$10,000 or \$100,000 worth of business, every year you'll find this system valuable.

Start the new year on firm ground by obtaining a copy of the Sylvania Business Record Book. Keep it daily and watch it help your profits increase.

Over 300 Attend Jersey City Service Meeting



A portion of the crowd are shown listening intently to Sylvania Bill Anderson lecture on a particularly knotty TV Service problem.

The Sylvania Caravan was close to completing its full circle of the United States when it moved into Jersey City, N. J. for a recent Sylvania Service Meeting. The meeting, held in the Masonic Hall, attracted over 300 servicemen who came to see Sylvania Sales Engineer Bill Anderson's popular demonstration-lecture on television servicing.

The meeting was sponsored by Harry Miles' Hallmark Electronics of Jersey City. Sylvanians in attendance were Metropolitan District Sales Manager Bob McNelis, Sales Representative Ted Swenson, and Advertising Manager of the Radio and TV Picture Tube Division Bob Penfield.

Peter Bibko of Household Electric, Bayonne, N. J., was the service dealer who won a Sylvania 216 Signal Generator.

OPS REPAIR ORDER DISCUSSED AT SERVICE SESSION

The Office of Price Stabilization recently took its first step towards issuing its new order regulating the charges of radio and television service establishments when it presented the proposed order to members of the Radio and Television Service Industry Advisory Committee.

The proposed order, which would be issued as an amendment to CPR, 34, contemplates the establishment of a schedule of maximum time allowances for most common repair services. The serviceman then would apply his regular hourly charge to arrive at the repair cost. The cost of labor and parts would have to be shown separately on each bill. If used parts or manufacturer's seconds were used in making the repair this fact also would have to be shown on the bill.

OPS also issued Amendment 4 to CPR 34 requiring all service establishments, including those in the radio and television field, to post, on an official poster supplied by the agency, the ceiling prices of their services.



LATEST MEMBERS OF SYLVANIA'S TRUCKLOAD OF PICTURE TUBES CLUB

Still more Sylvania Distributors are stocking fast-moving Sylvania TV Picture Tubes by the truckload to give their dealers customers the best possible service.

Top left there's a truckload for Bond Radio Supply, Waterbury, Conn. Left to right: Sylvania Curt Wall, Bond Radio President Ray Fulliero,

Bond store manager Arthur Andrus.

At bottom right another new member—Stallman of Ithaca, N. Y. Left to right: Bob Dean of Stallman; Sylvanians Justin McCarthy, George Isham, John Vail, Glen Victory; Art Stallman, R. J. West, Ed Lovell of Stallman, and Ralph Shields of Sylvania.

SPRINGFIELD SERVICE CENTER

(Continued from page 9)

is profitable is because it comes to the serviceman's shop. He has no pick up and delivery expense. This he has also found to be true of small set service. He points out that automobile radios, as a general rule, are built better than most home sets, are easier to repair and keep repaired—this is another good business point.

"We try to avoid call-backs by looking for possible future sources of trouble when we're repairing a set. If they can be fixed easily, and at no parts cost, we fix them then and there. If parts costs are involved we explain to the customer what will probably happen very soon and why. We emphasize how little extra it will cost to make this repair right now. It increases individual job sales and makes our customers much happier."

The partners operate their shop on a basis of 30-day guarantees on all of the work they do.

Bryant does considerable tourist business by giving them immediate

instead of his regular four-day service. Hotel and motel managers are informed of this and steer a good deal of such business to his shop. It is also an excellent source of profitable business for any service shop, he says.

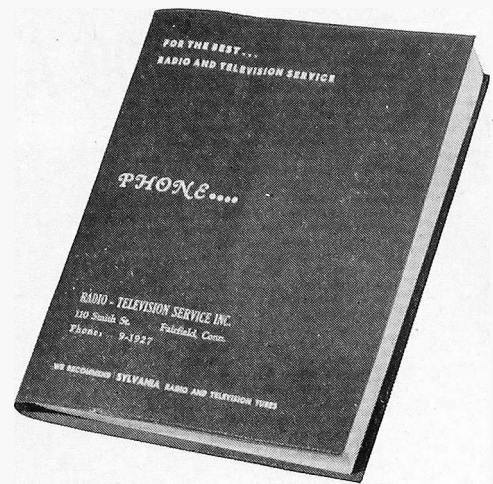
He has also found it good policy never to go ahead with repair work when examination reveals that the cost will be higher than the value of the set. He calls the customer in such an instance. Some tell him to go ahead, but most are interested in buying a new set.

Bryant does not believe it wise for the service man to plunge too deeply into retail set sales. He keeps only a few in his shop to handle such a situation as the foregoing.

All of these things have contributed to the Capitol Radio Shop's thriving business in automobile radio repair. The success of Bill Bryant and Glenn Mrasak of Springfield, Illinois is proof this neglected service field can be made profitable by alert servicemen.

* * *

The above article is reprinted with the permission of *Service Management* in whose pages it originally appeared.



NEW DEALER PHONE BOOK COVER PRICES

Prices for the new Sylvania dealer phone book cover, designed especially for radio and television service businesses, which was announced in last month's SYLVANIA NEWS are as follows:

In the small rural size (7 x 10 inches) 50 covers cost 59 cents each. Other quantities and prices are 100 @ 52 cents, 250 @ 49 cents, 500 @ 45 cents, 1,000 @ 40 cents.

In both the regular size (9½ x 11½ inches) and in the size designed for directories over 1¼ inches thick, prices are 50 covers @ 65 cents, 100 @ 60 cents, 250 @ 58 cents, 500 @ 55 cents, and 1,000 @ 49 cents.

Prices include three lines of imprinting. Covers come in either red, blue, green, brown, or black. Please specify color and imprint when ordering. Send all orders to Sylvania Electric Products Inc., 1100 Main Street, Buffalo 9, New York.

In This Issue

NEWS

SUPERIOR PERFORMANCE OF SYLVANIA PICTURE TUBES NOW PROVED BEYOND ALL DOUBT

MERCHANDISING

SPRINGFIELD, ILLINOIS SERVICE CENTER

TECHNICAL

EXPERIMENTAL UHF TELEVISION STATION KG2XDU

SYLVANIA NEWS

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Clarence Peffer
287 West Hazehine Ave.
Kenmore 17, N. Y.

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Permit No. 3402
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Form 3547 Requested

Vol. 19, No. 10

DECEMBER 1952

PUBLISHED BY
SYLVANIA ELECTRIC PRODUCTS INC.

MANUFACTURERS OF SYLVANIA RADIO TUBES, CATHODE RAY TUBES, ELECTRONIC DEVICES, FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, ELECTRIC LIGHT BULBS, PHOTOLAMPS, RADIO AND TELEVISION RECEIVERS.