# SERVICE MEMO

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February 6, 1963

SUBJECT: -hp- Klystron Signal Generators

Improving Spectral Characteristics by Narrow Band Operation

There have been several requests for a procedure for improving the spectral characteristics of -hp- Klystron Signal Generators by narrow band operation. With normal repeller voltage tracking adjustments, the pulse spectrum symmetry varies as the signal generator is tuned across the frequency band. This is due to variations in the klystron mode characteristics. If the spectrum is asymmetrical, it can cause incorrect readings when receiver bandwidth measurements are made.

The attached procedure provides a method for optimizing the spectral characteristics of -hp- Klystron Signal Generators at a single frequency. This information may be given to any of your customers that have a real need for it. Also, it should be brought to the attention of your sales engineers with microwave accounts.

A spectrum analyzer is required for performing the adjustments. This may limit the need for this information to some extent.

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PRINTED IN U.S.A.

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# -hp- MODEL KLYSTRON SIGNAL GENERATORS
# ALL SERIALS

## IMPROVING SPECTRAL CHARACTERISTICS BY NARROW BAND OPERATION

The repeller voltage tracking and klystron bias potentiometers provide the adjustment range necessary to allow klystron signal generators to operate with klystrons of varying characteristics. These adjustments provide in-mode operation of the klystron across the frequency band of the signal generator.

While the klystron adjustments provide for normal wide band operation, it is possible for the adjustments to be refined for improved operation at a single frequency. This is sometimes necessary when making receiver bandwidth measurements where the pulse spectrum should be as symmetrical as possible.

A spectrum analyzer is required for observing the pulse spectrum and setting the potentiometers for the optimum spectral pattern. Since the mode characteristics depend on the particular klystron and frequency desired, there is no set pattern for the adjustments.

The Operating and Service Manual should be used to re-adjust your signal generator for general purpose use when narrow band operation is no longer needed.

CAUTION: High voltages from well regulated power supplies are present in all of the instruments. Care should be taken when making these adjustments.

The following controls will effect beam current and klystron repeller voltages in the signal generators as listed:

| Signal Generator | Control | Adjusts |
|---|---|---|
| 614A | R163, R167 | Repeller voltage below 1250 mc. |
| | R164, R166 | Repeller voltage above 1250 mc. |
| | R196 | Klystron bias (Beam Current) |
| 616A | R163, R167 | Repeller voltage below 2440 mc. |
| | R164, R166 | Repeller voltage above 2440 mc. |

| Signal Generator | Control | Adjusts |
|---|---|---|
| 616B | R203, R212 | Repeller voltage below 2.7 gc. |
| | R204, R211 | Repeller voltage above 2.7 gc. |
| | R166 | Klystron bias (Beam Current) |
| 618A | R24, R25 | Repeller voltage below 4.25 gc. |
| | R30, R32 | Repeller voltage above 4.25 gc. |
| | R8 | Klystron beam current |
| 618B Below S/N 1336 | R175 | Repeller voltage below 4.2 gc. |
| | R173, R178 | Repeller voltage between 4.2 gc and 5.0 gc. |
| | R170 | Repeller voltage above 5.0 gc. |
| | R341 | Beam current adjust. |
| | R352 | Pulse beam current adjust. |
| 618B Above S/N 1335 | R175 | Repeller voltage below 4.2 gc. |
| | R173, R178 | Repeller voltage between 4.2 gc and 5.0 gc. |
| | R170 | Repeller voltage above 5.0 gc. |
| | R341 | Beam current adjust. |
| | R352 | Pulse beam current adjust. above micro-switch operation. |
| | R355 | Pulse beam current adjust below micro-switch operation. |
| 620A | R173, R175 | Repeller voltage below 8.6 gc. |
| | R170,R178 | Repeller voltage above 8.6 gc. |
| | R341 | Beam current adjust |
| | R352 | Pulse beam current adjust |

## TEST EQUIPMENT REQUIRED

### Description

Spectrum Analyzer

## PROCEDURE

1. Disconnect power. Remove cabinet from signal generator.
2. Connect power and allow signal generator and spectrum analyzer to warm up.

3. Connect signal generator to spectrum analyzer. Tune both units to the desired frequency.

4. On signal generator set the modulation selector switch to OFF and sero set the meter with the ZERO SET control.

5. Turn the modulation selector switch to CW. Turn the POWER SET control to give power set indication on the POWER SET METER.

6. Turn the modulation selector switch to INT., the SYNC SELECTOR switch to X10, the PULSE RATE control to 100, the PULSE WIDTH control to 1 microsecond.

7. Adjust attenuator. Observe spectrum on spectrum analyzer. If required, adjust repeller tracking and beam current potentiometers to optimize spectrum symmetry. Re-tighten lock nuts on potentiometers after adjustments are completed.

8. Disconnect power. Replace signal generator cabinet.

9. This completes the procedure. However, your signal generator should be recalibrated in accordance with the Operating and Service Manual when narrow band operation is no longer needed.