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THE
WURLITZER COMPANY
NORTH TONAWANDA, NEW YORK

NORTH
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DIVISION

July 22, 1966

TO ALL SERVICE MANAGERS

Dear Service Manager:

Quite often the question has been asked by servicemen.... “Why can't we purchase transistors, which are used on the printed circuit board of the amplifier, from our local electronics supply parts houses in our area during emergencies?” You can...providing the necessary equipment, such as a good transistor checker that will measure Beta (current gain) of the transistor, is available.

During the introduction of the solid state amplifier I believe the field service engineers had mentioned how important it was if and when a transistor used on the printed circuit board was found defective, to replace it with one of the same color code as the one removed. We use four different color coded transistors on the printed circuit board as you have noticed, such as a blue, black.. green and yellow. Each transistor, in respect to its color coding, has a specific Beta (current gain).

Let's take the black color coded transistor for example. This transistor has a Beta range from 110 to 140. This black color coded transistor is incorporated in the A.L.C. circuit of our amplifier. If a transistor of less than 110 in Beta was used in this circuit, the A.L.C. voltage would be insufficient, causing undesirable level action and distortion. If a transistor of a higher Beta than 140 was used, a reduced output would be noted. The transistors used on the printed board (Q1 to Q11) of the 546 and 546B Solid State Amplifiers are RCA’s 2N2614s. Each transistor, after our purchasing, is graded at our plant through individual testing and then color coded as to its Beta. A stock RCA 2N2614 we have just mentioned can range from 90 to 425.

For your assistance we have listed the following color coding with respect to Beta of the low signal transistors used on the printed circuit board...

Yellow	-	Beta Range	90	to	210
Black	-	Beta Range	110	to	140
Green	-	Beta Range	170	to	425
Blue	-	Beta Range	250	to	400

The power transistor and filter regulators are also imprint color coded and have the same part number. The color imprints used are red, orange, yellow, green and blue. When replacing an output transistor, its color code must be the same as the one removed or replace both output transistors of another color. The output transistors have to be a matched pair as far as color coding...for instance, two orange, two red etc •• •• for distortion free output for a given channel.

The power PA output transistors can be purchased from most electrical supply houses who handle the Delco transistor line. These come already color coded and the Delco part number is DTG110, and color coding is as follows...

DTG110 - Color Coded Red	- Beta Range	74	to	111
DTG110 - Color Coded Orange	- Beta Range	110	to	133
DTG110 - Color Coded Yellow	- Beta Range	119	to	164
DTG110 - Color Coded Green	- Beta Range	145	to	200
DTG110 - Color Coded Blue	- Beta Range	179	to	350

The driver transistor Q15 and Q18 is also an RCA transistor and RCA's part number for this particular transistor is 40254. It is not color coded and its Beta is between 30 and 70.

Q12, the regulator transistor, can be replaced with either a red or blue PA transistor such as a Delco DTG110 red or blue.

Several service managers have called and stated they are using the Sencor TR110 Transistor Checker and find the Beta range on the meter only goes to 200. We have been in contact with the Sencor Company and they state when checking a transistor with a Beta of over 200, set the bias control to 18 for the PNP type transistors and 82 for the NPN type transistors. Multiply the reading on the meter by two. This gives fair results of these high Beta transistors when checking.

We have some information we thought perhaps would be of some interest on reforming electrolytic capacitors which have become deformed. Electrolytic capacitors which are not in use for a period of time, such as the ones in your stock bins, should not be incorporated into a circuit until they have been reformed. This will be more apparent with the larger capacity capacitors such as 100 mfd. 25 volt, 500 mfd. 15 volt, 1200 mfd. 35 volt, 1000 mfd 500 volt, 500 mfd. 30 volt can type capacitors and the 3000 mfd. 50 volt can type etc.

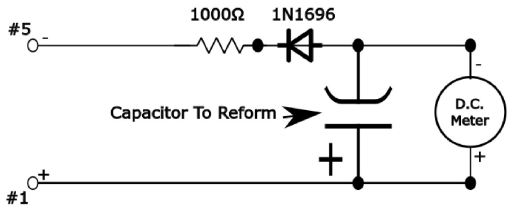
After an electrolytic capacitor has been in storage for a time, as previously mentioned, the dielectric (a thin film which is formed on the surface of the aluminum electrode by a liquid or paste electrolyte) thins out increasing the capacity of the electrolytic capacitor,

also decreasing its working voltage. If a capacitor in its extreme deformed state is incorporated into a circuit, heating and destruction of the capacitor might result.

Reforming electrolytic capacitors is a simple task. The necessary components for reforming are...

1. Conventional DC Voltmeter
2. 1000 ohm 2 watt resistor
3. 1 diode (1N1696)
4. Random length of wire
5. The DC voltage from a 546 or 546B Amplifier

The amplifier is used for the necessary reforming voltage which is available on the remote control terminal strip between terminals 1 and 5. The circuit using the diode, resistor, capacitor and meter should be as follows...



With the capacitor in the circuit as illustrated and meter connected, apply voltage to this circuit. Observe the meter reading. It may rise very slowly, which is normal for a deformed capacitor. After the meter has reached the indicated working voltage of the capacitor it can be assumed the capacitor is now formed, and the voltage should be removed. The maximum voltage available with the circuit shown after capacitor is formed can be as high as 46 volts, which is more than sufficient in voltage to reform the capacitors we've mentioned. Do not exceed the voltage at which a capacitor is rated.

From the reports we've received from you fellows, I guess the circuit breaker now installed in the playrak in place of the . 8 amp. fuse has been well accepted in the field. In the very near future you will also find another circuit breaker and this will be found in the junction box of the 200 selection phonograph only. Engineering, after research, has found circuit breakers that will replace the .8 amp. fuse in the playrak and the .8 amp. fuse in the 200 selection junction box.

Requests have been received from some of the distributors asking can they get the circuit breaker for the 2900 Series Phonographs. It is available and it is called a circuit breaker packet and comes complete with installation instructions and can be ordered under Part No. 128659 (installation time approximately 10 minutes).
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Recently we have made several changes in the playrak and they are as follows. The double piece main accumulator shaft was replaced with a one piece shaft.

It was found that a much linear cancelling operation was feasible throughout the entire range of the 15 tooth accumulator wheel regardless of what setting per coin and should also be of assistance if and when adjustment of this assembly is required.

Periodically we have received information that after depositing two quarters consecutively, the playrak would only register three credits and not activate the 50¢ coin magnet on the second quarter. After research it was found if the phonograph was operating on an extremely low voltage it could happen intermittently. To correct this possibility of failure, we have changed the 50¢ accumulator spring. The new spring will be of a copper color and will only be found on the 50¢ accumulator wheel at this time. If you have extremely low voltage areas in your territory and experience a complaint of the above nature, new springs can be ordered from our Parts Department using Part No. 124849.

My kindest personal regards.

Sincerely yours
THE WURLITZER COMPANY
C. B. Ross
Service Manager