# TECHNICAL MANUAL
for
# AUTOMATED TRANSLATOR

## MODEL CHGR-4


THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y. OTTAWA, CANADA

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## Introduction

The TMC Model CHGR-4 Translator contains all the circuitry covered in the CHG( )4 manual, plus automation circuitry. The automation circuitry provides remote frequency selection and preset automatic gain control. Remote frequency selection is performed by supplying a ground (from an external source) to the frequency switch driving Ledex motor, through its coupled notch homing wafer. The automatic gain control circuitry provides a preset automatic unit gain by comparing the CHGR output to a dc referenced 1.75 MHz IF input from the CMRA.

Figures 1A and 2A supply basic functioning of the automated circuits. For more detailed information refer to associated schematic:

| | | |
|---|---|---|
| Figure 3-A | CK-1462 | SERVO SENSOR |
| Figure 4-A | CK-1463 | SENSING CIRCUIT |
| Figure 5-A | CK-1469 | FREQUENCY SELECTOR SWITCHES |
| Figure 6-A | CK-1684 | SBGR-4 AUTO GAIN SERVO CONTROL |

## 1. CHGR Remote Ledex Operation. Refer to Figure 1A.

Remote operation of each Ledex motor in the CHGR consists of two steps. First, remotely positioning an external master step switch so that control may be directed to a particular Ledex motor. Second, supplying a remotely controlled ground through the associated Ledex notch homing wafer to determine the frequency position that the Ledex motor will stop.

If control were to be directed to the 10 MHz Ledex motor, external wafers "1" and "2" would be positioned as shown in figure 1A. A positioning ground (0-9) then supplied to S107, the 10 MHz notch homing wafer would keep the 10 MHz Ledex motor energized until the notch on the wafer removed the ground. For example; if a frequency of 15.0000 MHz were programmed, a ground seen on pin "Y" of J119 would place S107 in the position as shown on figure 1A. The positioning of the 1 MHz frequency switch would require rotating the master step switches (1 and 2) one position, then supplying an external ground to pin "C" (position 5) of J119. S106 would keep the 1 MHz Ledex motor energized until position 5 on the notch homing wafer removed the ground. Similar actions for the 100 KHz, 10 KHz, 1 KHz and the 100 Hz frequency switches would follow with the positioning ground for "0" supplied by pin X of J119.

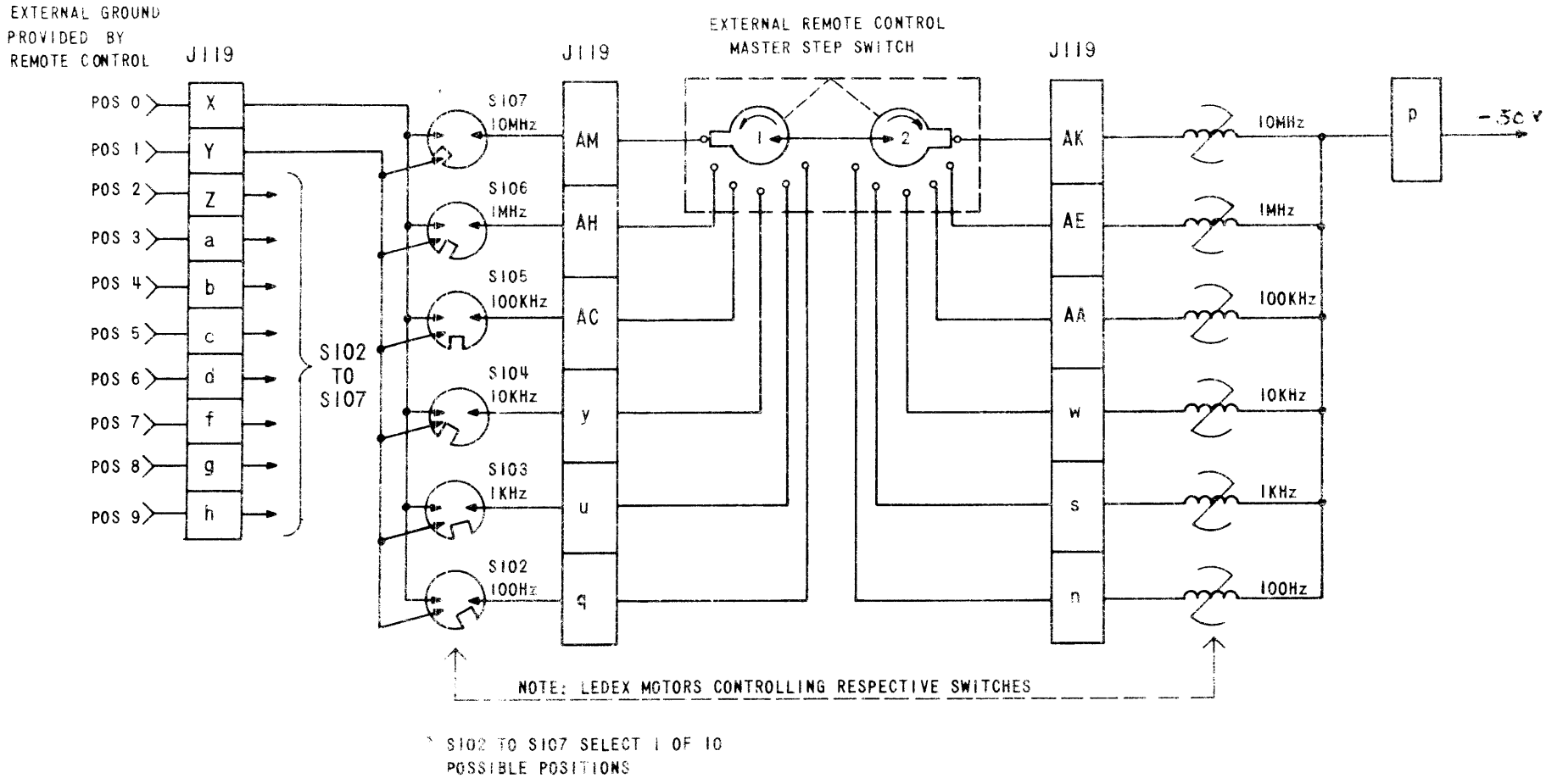
## 2. CHGR Automatic Gain Control. Refer to Figure 2A.

The automatic gain control circuit in the CHGR automatically adjusts its unit gain to a constant level by comparing a dc referenced 1.75 MHz IF input signal from the CMRA to a sample of the CHGR output. Should the CHGR unit gain tend to change, due to frequency change, AC energizing voltage is routed to the "Up" or "Down" winding of the RF Output motor to maintain the unit gain constant.

Pin 1 of Z117 receives a sample of the 1.75 MHz IF input from J126 on the CHGR. The 1.75 MHz signal is dc amplified and adjusted by R6, the DC Level Adjust before leaving Z117 at pin 4 and entering pin 1 of the Drive Comparator. The DC Level Adjust provides an adjustable dc reference for the Drive Comparator.

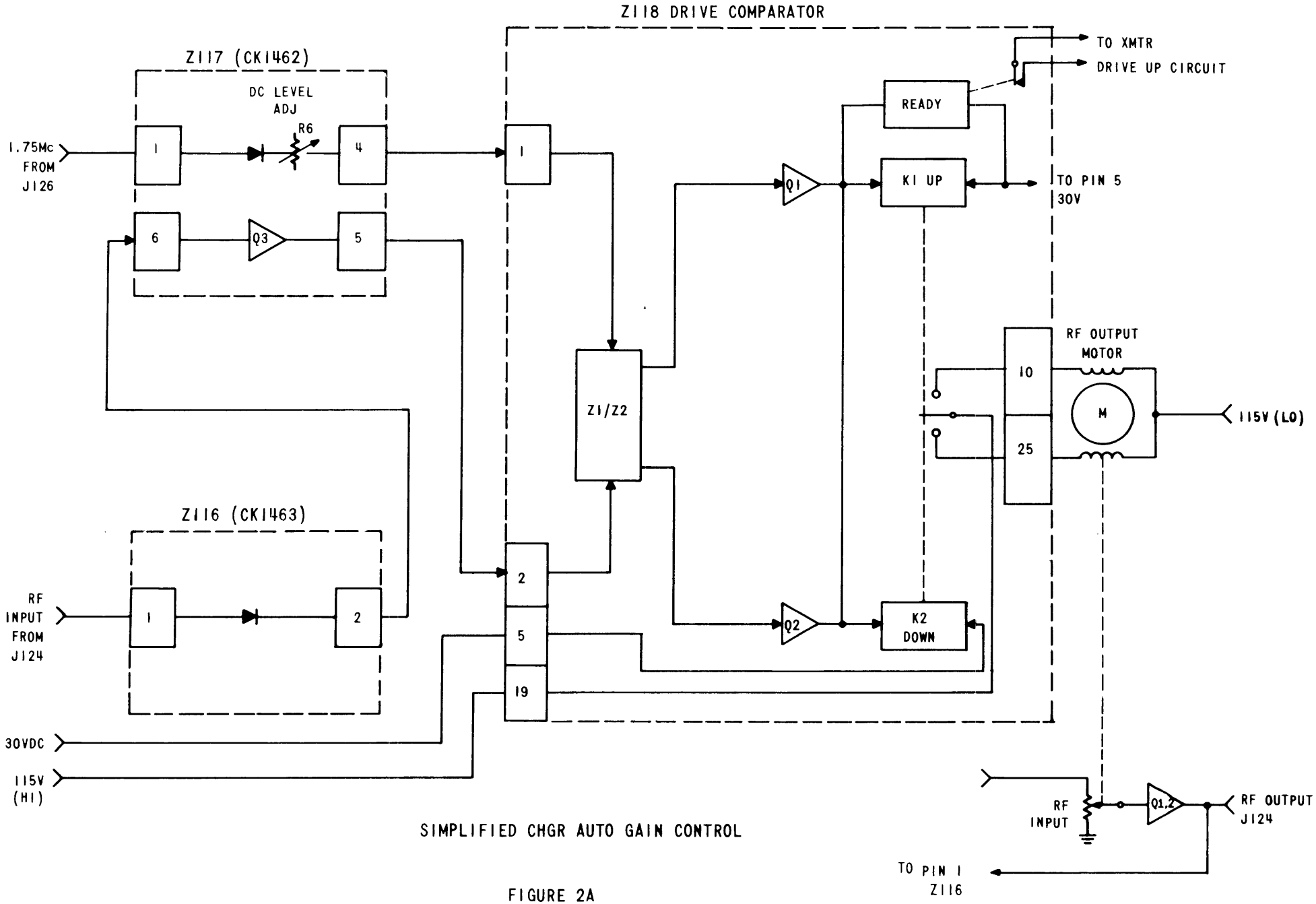
A sample of the rf output from J124 of the CHGR is applied to pin 1 of Z116, a rectifying sense circuit. The rectified dc output from Z116 leaves pin 2 and enters pin 6 of Z117, the Servo Sense board. The dc signal is then routed through isolating emitter follower Q3 before application to pin 2 of the Drive Comparator board.

When the CHGR dc input at pin 2 is less than the 1.75 MHz dc reference signal on pin 1, Q1 a relay driver is forward biased sufficiently, to energize K1 the "UP" relay. Contacts of K1 route AC energizing voltage to the motor which will increase drive until the unit gain is restored. When the CHGR input at pin 2 in greater than the voltage at pin 1, Q2 is forward biased causing K2 the "Down" relay to be energized. When K1 or K2 are energized the "Ready" relay also energizes, opening a contact closure supplied to the transmitter automatic drive circuit. This provision prevents erratic automatic drive changes in the transmitter while the CHGR is correcting its unit gain.



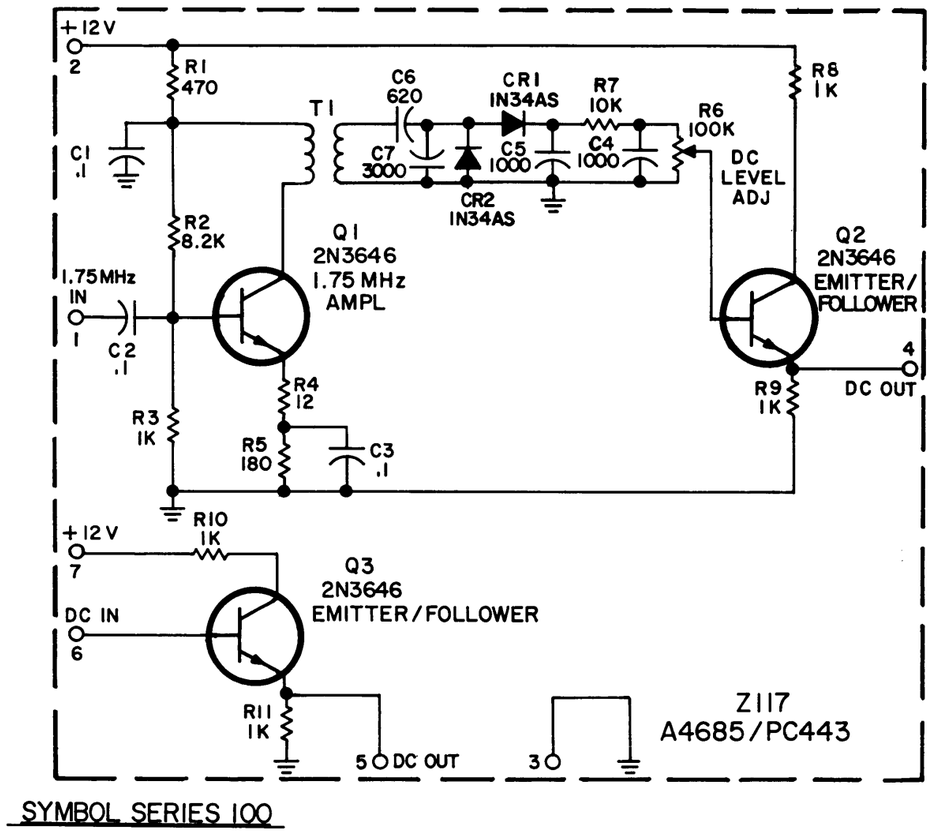

SIMPLIFIED CHGR REMOTE LEDEX OPERATION
(SHOWN IN 10MHz POSITION)

FIGURE 1A




SIMPLIFIED CHGR AUTO GAIN CONTROL

FIGURE 2A




SYMBOL SERIES 100

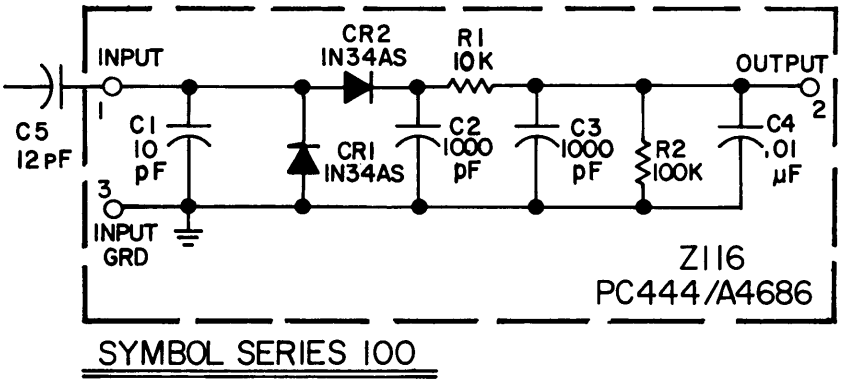
UNLESS OTHERWISE SPECIFIED

1-ALL RESISTANCE VALUES ARE IN OHMS, 1/4 W.

2-ALL WHOLE NUMBER CAPACITANCE VALUES ARE IN PICOFARADS. ALL DECIMAL NUMBER VALUES IN MICROFARADS.

| LAST SYMBOLS |
|---|
| C7 |
| CR2 |
| Q3 |
| R11 |
| T1 |

Figure 3A. Servo Sensor




SYMBOL SERIES 100

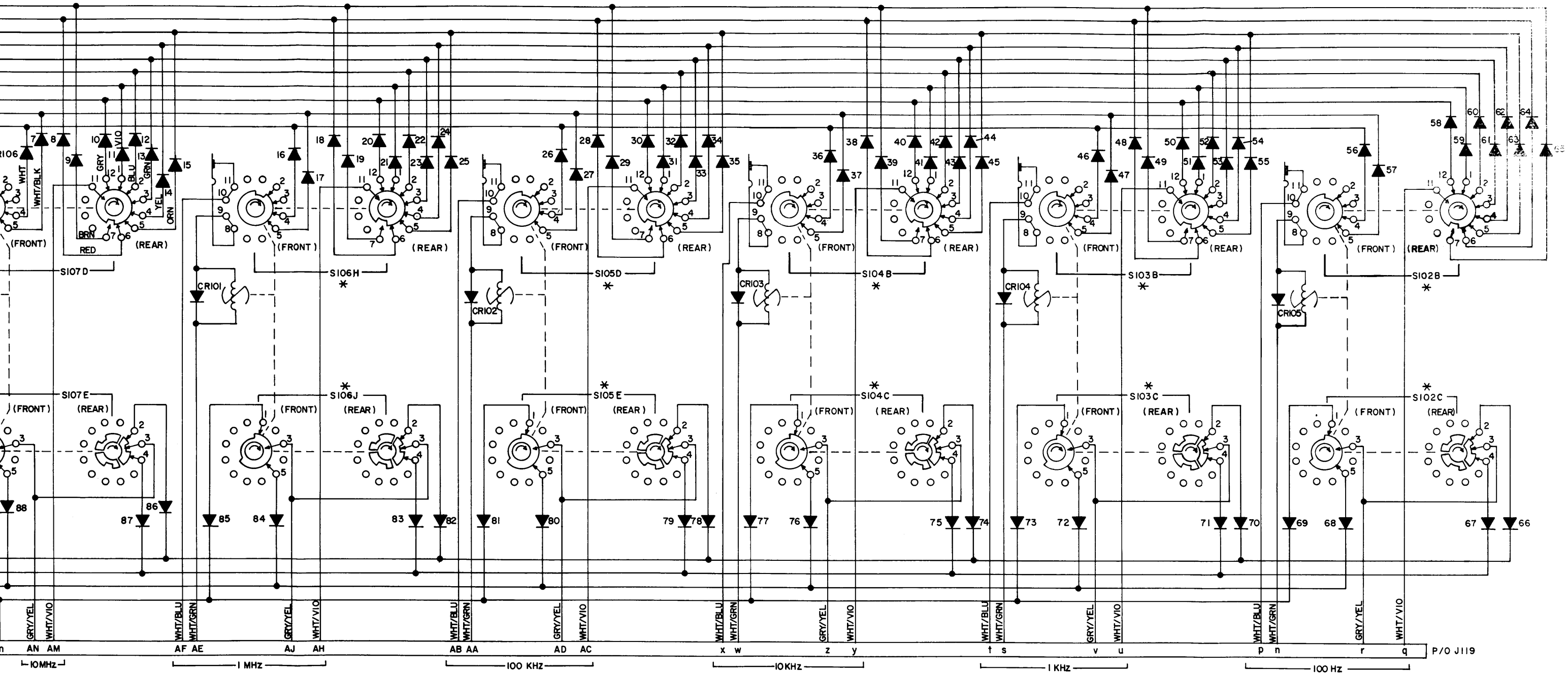
NOTE: RESISTORS ARE 1/4 WATT.

| LAST SYMBOLS |
|---|
| C5 |
| CR2 |
| R2 |

CK-1463A

Figure 4A. Sensing Circuit

*NOTE
SEE SWITCH S107 D & E FOR WIRE COLORS OF COMMON LEADS.

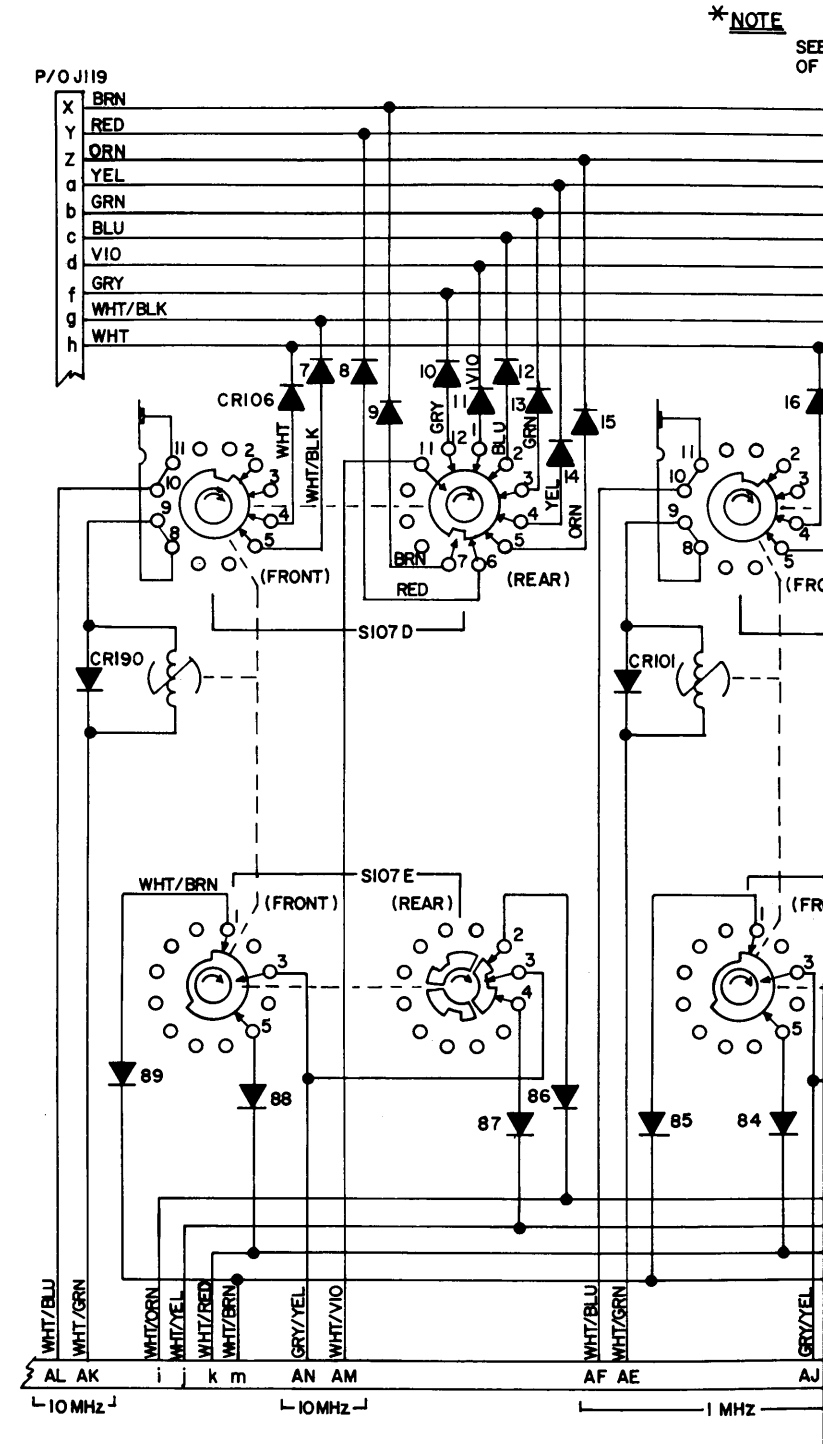



UNLESS OTHERWISE SPECIFIED

1-CR101-CR105,CR190 ARE TYPE "DD111" (OR TYPE "IN538").
2-CR106 THRU CR189 ARE TYPE "IN914".
3-SWITCHES ARE SHOWN IN NO.1 POSITION.

| LAST SYMBOLS | MISSING SYMBOLS |
|---|---|
| CR190 | |
| J119 | J101 THRU J118 |
| S107 | S101 |

Figure 5A. Frequency Selection Switches




UNLESS OTHERW

1-CR101-CR105,CR

2-CR106 THRU CR

3-SWITCHES ARE S

CK-1469

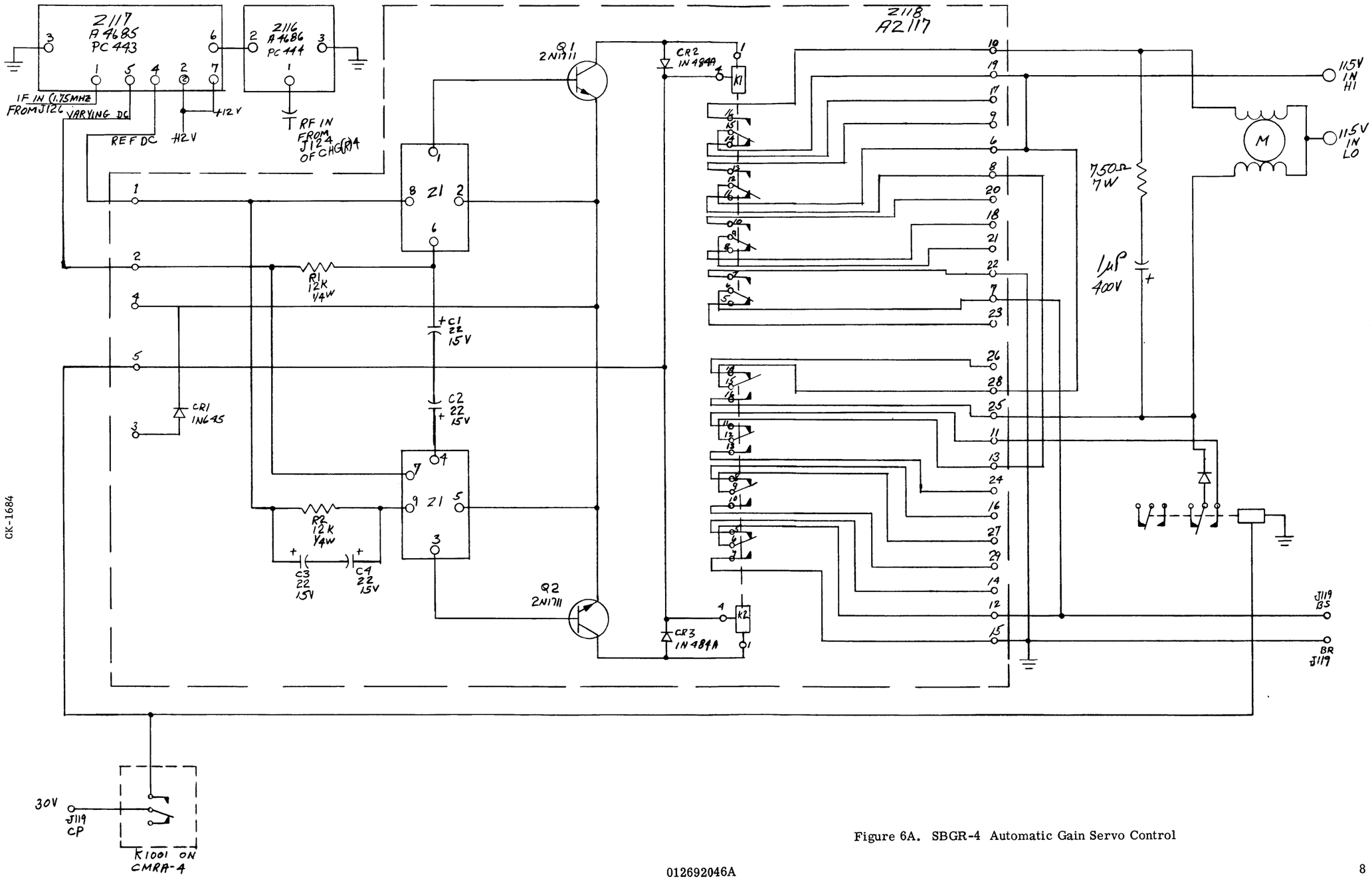



Figure 6A. SBGR-4 Automatic Gain Servo Control