

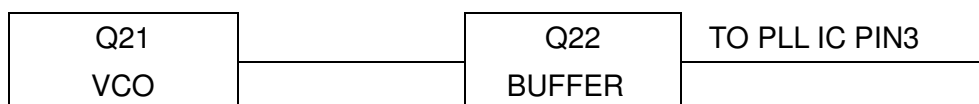
MIDLAND 203 PLUS CIRCUIT DESCRIPTION

INTRODUCTION

1.MIDLAND M203 PLUS AM/FM 40CH “EMG 9/19 AND POWER OUTPUT 4W /1W MULTI BAND (D3,D4,IT,I2,EU,EC,PL,UK)

FREQUENCY 26.965MHZ – 27.405MHZ

2.THE FREQUENCY FOR TRANSMITTER AND RECEIVER LOCAL FREQUENCIES ARE ALL FROM A CRYSTAL (X2) 2.00MHZ BY MEANS OF A PHASE LOCK LOOP. THE FIRST LOCAL OSCILLATOR FREQUENCY ARE 16.26MHZ(CH1) TO 13.7MHZ (CH40) FOR TRANSMITTER



TX LOCAL FREQUENCY : 13.48MHZ (CH1) TO 13.70MHZ(CH40)

RX LOCAL FREQUENCY : 16.26MHZ (CH1) TO 16.70MHZ (CH40)

THE VCO OPERATE FREQUENCY FOR THE RECEIVER IS 16.26MHZ (CH1) TO 16.7 MHZ (CH40).AS THE FIRST LOCAL OSCILLATOR ,INJECTED THROUGH THE BUFFER AMPLIFIER Q22 IN TO THE FIRST MIXER

DESCRIPTIONS OF EACH BLOCK

INTRODUCTION

THE SYNTHESIZER IS IMPLEMENTED WITH THE FOLLOWING COMPONENTS ARE : PLL IC(IC6), CRYSTAL(X2) ,Q21,Q22.D19 ARE CLAPP OSCILLATOR CIRCUIT TO OPERATE AS VCO OF THE PLL IC.Q20 IS A SWITCHING TO CONNECT OR DISCONNECT THE TUNING CAPACITOR IN THE VCO OSCILLATOR TANK CIRCUIT FOR TRANSMITTER OR RECEIVER

Q22 WORK AS A BUFFER AMP FOR RX LOCAL FREQUENCY AND TX CARRIER GENERATING FREQUENCY.VCO,

REFERENCE FREQUENCY (CRYSTAL)

THE CRYSTAL, X2(2.0MHZ) AND OTHER COMPONENTS AS IC6 PIN11(OSCI) CAN MAKE A REFERENCE FREQUENCY OSCILLATOR WITH CK (Pin6), DATA (Pin7), EN (Pin8) TERMINALS IN IC6 ARE USED FOR MCU SERIAL DATA INTERFACE . THIS SET IS USED EXTERNAL CLOCK SOURCE BY THE CRYSTAL. THE REF_FREQUENCY(2.0MHz) IS ADJUSTED BY TC1 EXACTLY.

VCO

THE Q18, Q19 AND SURROUNDING PARTS ARE CONSISTING A CLAPP OSCILLATOR WORKS AS A VCO OF ICPLL (IC6) WITH APPROPRIATE CONTROL VOLTAGE ON D19 WITH BY ADJUST T7. VCO CAN BE OSCILLATE OVER THE REQUIRES RANGE OF 13.48MHz TO 13.7.875MHz .

PHASE DETECTOR AND VCO CONTROL

THE PHASE DETECTOR IS A DIGITAL PHASE COMPARATOR WHICH COMPARES THE PHASE OF THE REFERENCE SIGNAL WITH PROGRAMMABLE DIVIDER OUTPUT SQUARE WAVES AND DEVELOPS A SERIES OF PULSE WHOSE DC LEVEL DEPENDS ON THE PHASE ERROR OF EACH SIGNAL.

THE PHASE DETECTOR PULSE OUTPUT IS FED TO AN ACTIVE LOW PASS FILTER, AND FED TO VARICAP D19 CONTROL THE VCO FREQUENCY.

SWITCHING OF TUNING CAPACITOR IN VCO

THE VCO CIRCUIT MUST USE WITH A WIDE RANGE OF FREQUENCIES 13.48MHz TO 13.70MHz FOR TRANSMITTER AND 16.26MHz(CH.1) TO 16.70MHz FOR RECEIVER.

TO COMPLY ABOVE RANGE OF VCO, THE TUNING CAPACITANCE SHOULD SWITCHED FOR TRANSMISSION OR RECEPTION.

THE TUNING CIRCUIT THE VCO IS WORKING AS A RECEIVER AND TRANSMITTING OF BECOMES TURN ON. AND BECOMES OFF BY T7 AND D19 CAPACITANCE OF MAKE TUNING FUNCTION.

RECEIVER LOCAL OSCILLATOR OUTPUTS

1ST MIXER : THE OUTPUT SINGLES OF Q22 IS INJECTED TO THE SOURCES OF 1ST MIXER Q3 IN THE 1ST IF MIXER SECTION. AND FILTER BY 10.7MHz FILTER (CF1)

2ND MIXER : THE OUTPUT OF 10.240MHz OSCILLATOR CIRCUIT WITH X1 IS INJECTED INTO THE Q4 INCOMING IF SIGNAL AND 10.695MHz SIGNAL AND FILTER BY CF2 TO EXTRACT 2ND IF SIGNAL 455 KHz.

DESCRIPTION OF OTHER CIRCUITS

TRANSMITTER

RF AMPLIFICATION

THE OUTPUT OF BUFFER AMP Q22 IS FED THROUGH TUNING TO DOUBLER AMP Q23 TO DOUBLER COIL T8,T9 TO THE BASE OF PRE DRIVER AMP Q24. THE PRE DRIVER AMP OUTPUT SIGNAL FED THROUGH TO DRIVER AMP BASE Q25, FED THROUGH TO POWER AMP Q26 TO THE ANTENNA.

CIRCUIT FOR SUPPRESSION OF SPURIOUS RADIATION

THE TUNING CIRCUIT BETWEEN THE OUTPUT OF FINAL AMP Q26 AND ANTENNA, "LPF TYPE" NETWORK L9 ,L7, L8,C114,C115, C116A,,C113,C115 SERVES AS A SPURIOUS RADIATION SUPPRESSOR.

THIS NETWORK ALSO SPURIOUS RADIATION SUPPRESSOR.

THIS NETWORK ALSO SERVES TO MATCH THE IMPEDANCE BETWEEN TX POWER TR Q26 AND ANTENNA.

MAXIMUM MODULATION CONTROL

MODULATION SIGNALS ARE FILTERED WITH RC NETWORK AND GOES TO THE PRE MIC AUDIO_AMP IC(IC2-B) TO AUDIO AMP IC(IC3) TO MAKE NOMINAL SIGNAL LEVEL TO ACHIEVE WANTED MODULATION.TO CONTROL INCOMING AUDIO SIGNAL BY AMC CIRCUIT. THE AMC ARE Q16,Q14,RV4 .THAT'S CIRCUIT CONTROL MAXIMUM MODULATION CAPABILITY AND MAXIMUM MODULATION LIMITTING.

RECEIVER

(1) RF AMP Q2 AMPLIFIER RF SIGNAL FROM ANTENNA AND THEN THE AMPLIFIED RF SIGNAL IS FED THROUGH MIXER 1ST WITH BY SOURCE ALSO VCO SOURCE'S FREQUENCY LOWER 10.695MHz THAN THE FREQUENCY OF EACH CHANNEL IS SUPPLIED TO MIXER.

(2) THE SOURCE OF 10.695MHz FREQUENCY IS FED THROUGH CF1 TO 2'ND MIXER Q4.

(3) THE 455 KHZ FREQUENCY SIGNAL IS PRODUCED FROM Q4 BY MIXING THE OUTPUT SOURCE OF CF1 10.695MHz FILTER AND THE SOURCE OF 10.24MHz FREQUENCY FROM CRYSTAL OSCILLATOR X1 AND FILTER BY CF2.

(4) THE Q5 IS IF AMP, AND T4,T5 IS DETECT AUDIO SIGNAL RECOVER (AM) AND IC4,T11 (FM) . THE AUDIO SIGNAL IS FED THROUGH TO AUDIO POWER AMP(U6) FOR DRIVING SPEAKER.