

11. Explanation of Major Circuits

Five major circuit blocks are explained on its basics and signal flows.

11-1 Main DC Power Supply

11-2 Power Amp, L.P.F.

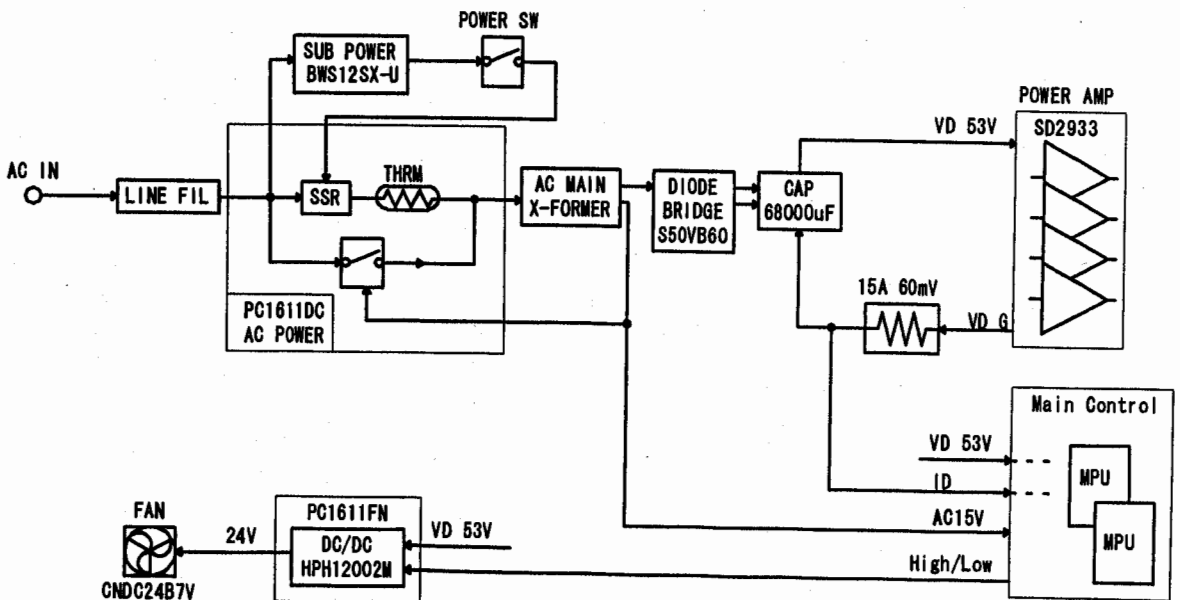
11-3 RF Power Detector, TX/RX Switching

11-4 Main Controller

11-5 Band Decoder, Frequency Counting

11-1 Main DC Power Supply

The main DC power supply feeds the 50V DC power to the final PA stage. It is a non-regulated power supply and consists of the compact power transformer using the oriented core, bridge diode rectifier, and high capacity electrolytic capacitor of 68,000uF for the filter. Soft start circuit suppresses the AC rush current using the thyristor. A part of 50V line is converted to 24V through DC-DC converter and is supplied to the cooling fan.

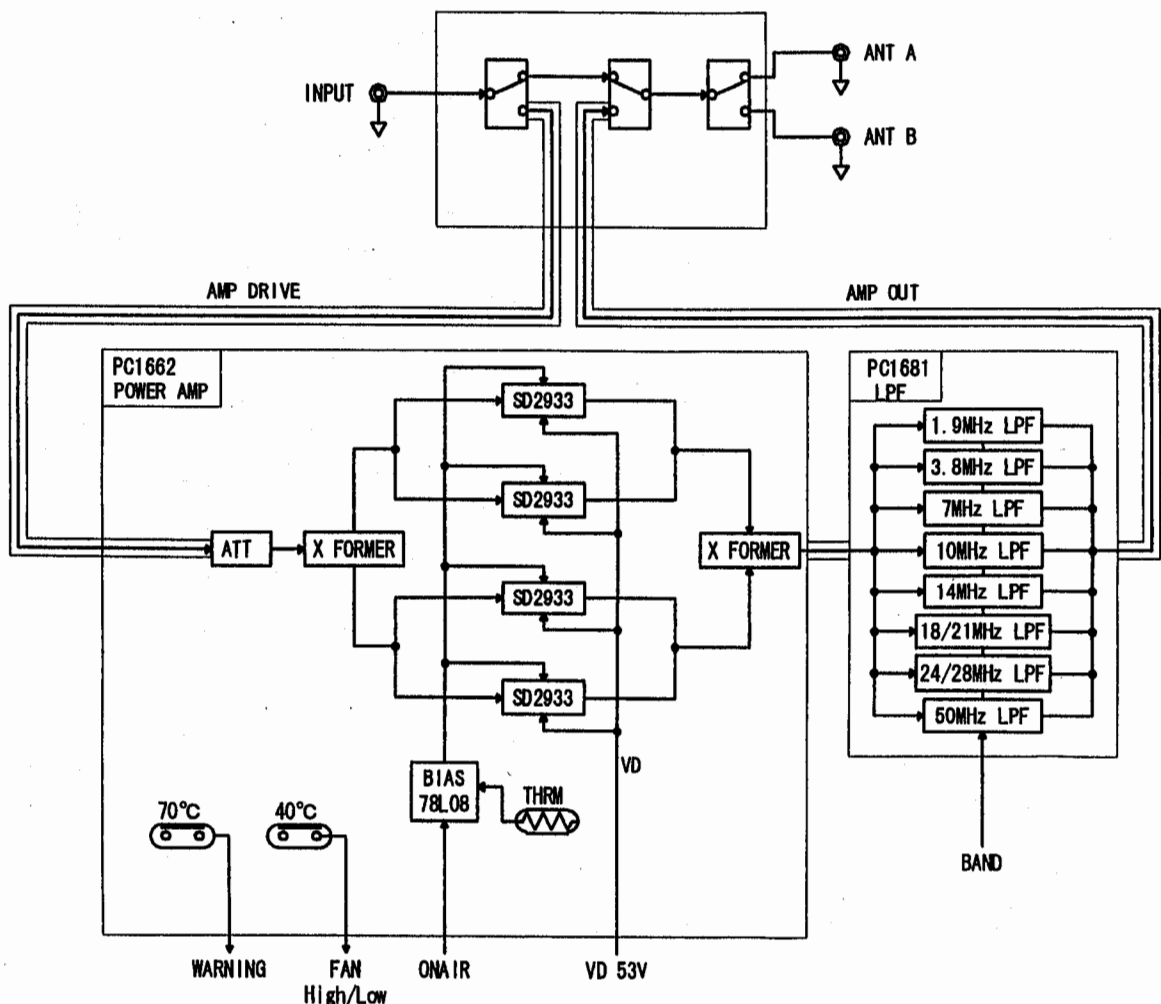


11-2 Power Amp (PA PC1662) / L.P.F. (PC1681)

RF PA is the heart of this amplifier and is composed of four pieces of SD2933 FET made by ST Micro, a French-Italian joint venture firm. The amplifier type is a parallel push-pull of class AB . Gate bias supply circuit is regulated for the best stability and is thermally compensated as well.

The PA has a 6dB attenuator at the input side for the gain reduction and enhanced stability of wide band power PA characteristics. On the heat sink are two kinds of thermal sensors to detect temperatures of 40 deg C, and 70 deg C respectively. At 40 deg C, the cooling fan is shifted to high speed mode. At 70 deg C, the amplifier is locked to RECEIVE state for the safety of FET devices.

In L.P.F. (output low pass filter) circuit, there are eight kinds of band filter that is selected either by auto band decoder or by manual band switch. Each L.P.F. has a harmonics rejection capability to meet the international telecommunication equipment standards.

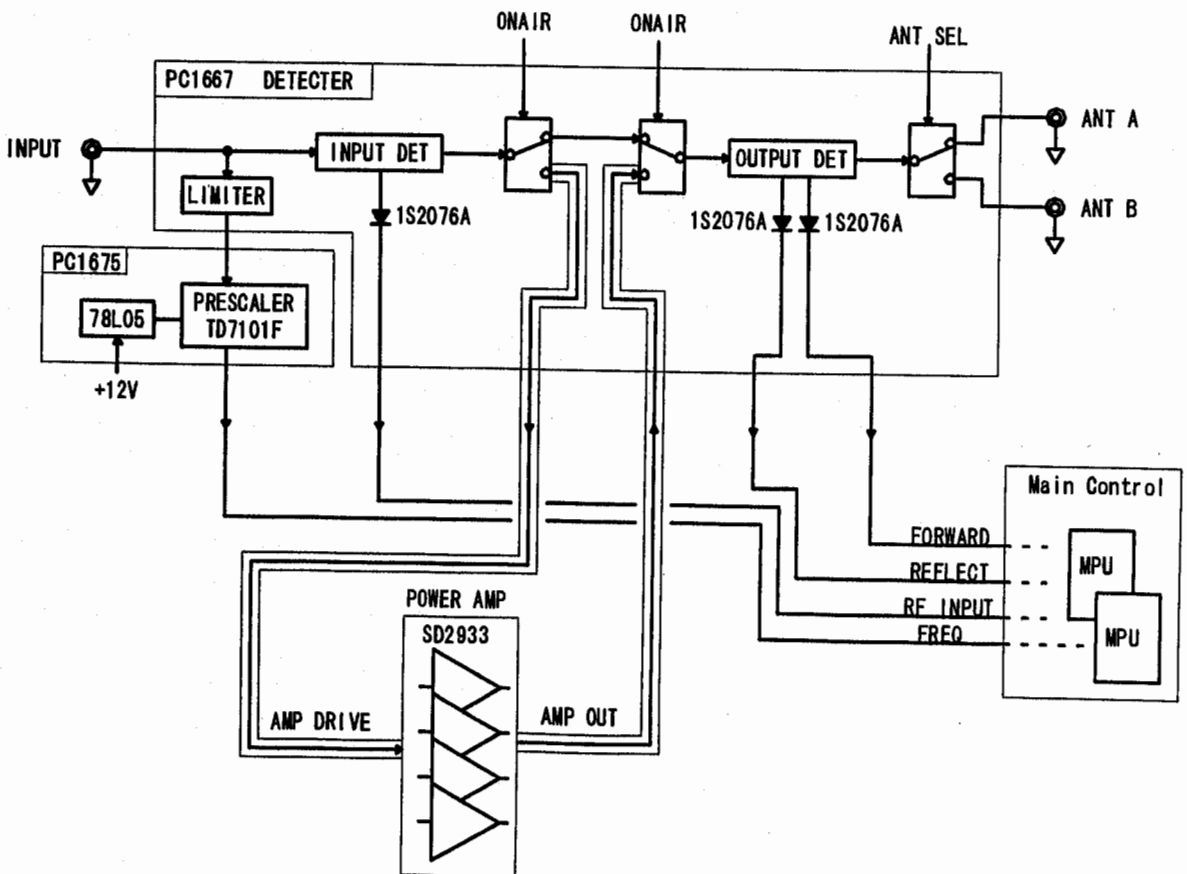


11-3 RF Power Detector/ TX-RX Switch (PC1667)

As illustrated below, there are two RF power detectors on this board. The one detects the drive signal level from the radio and the other monitors the out going power as well as reflected power from the load (antenna). These detected signals are sent to the MPU of PC1665, Main Control board, that monitors the operating condition of the whole amplifier.

The TX-RX switch (Send-Receive switching) will switch the flows of drive power/ output power and incoming signal from antenna with two high speed relays mounted at input and output sides of the PA. Two channel antenna switch (A/B) is also installed on this board.

The limiter on this board together with prescaler on PC1675 help MPU in Main Control count the frequency of the RF drive signal.

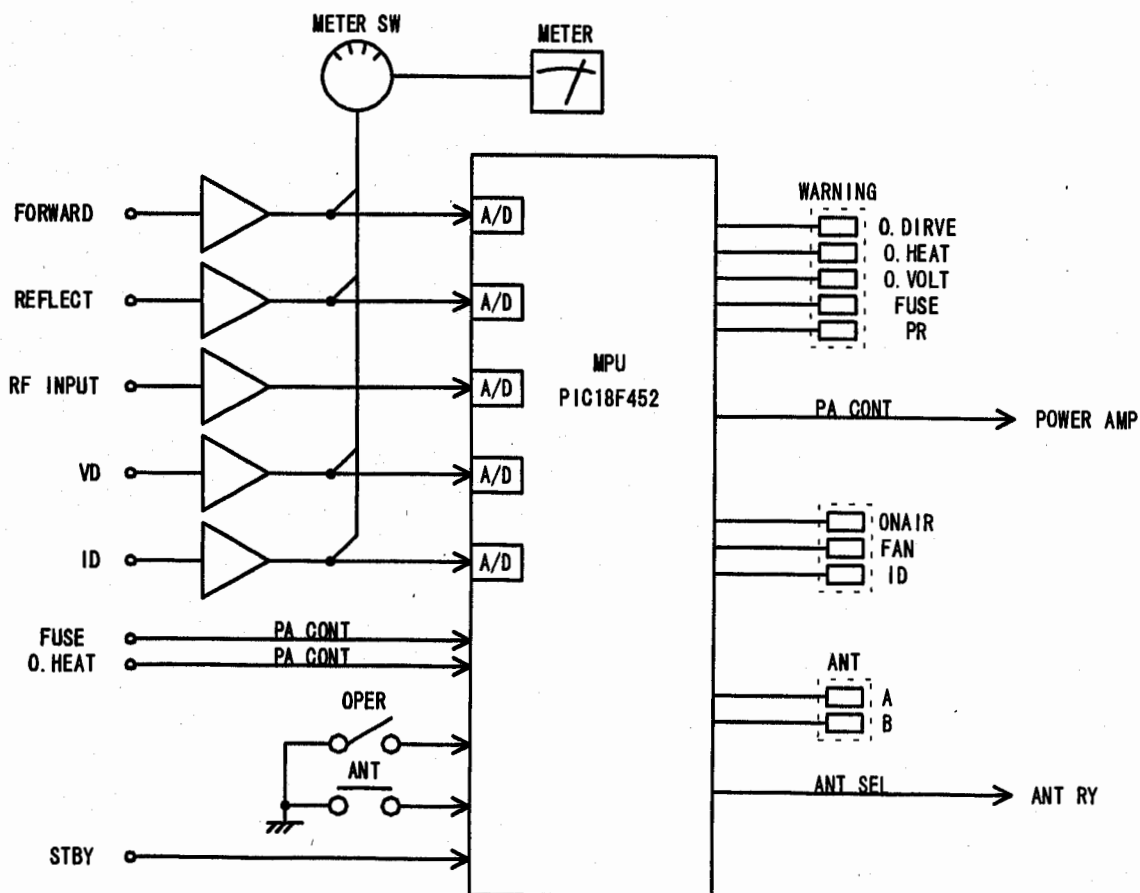


11-4 Main Control (PC1665)

This is the heart of the control signal processing of HL-1.5KFX. It judges the operating condition of the amplifier and issues the commands to the peripheral circuits as well. Various analog signals are put into MPU such as RF drive from the transceiver, RF power signals at various points, DC power supply information and so on.

These are converted to the digital signals through A/D converter . MPU will then numerically compute the data, to judge the amplifier status, and issue commands for protections.

Transmit-Receive switching, high/low control of fan, and LED lightings are all commanded by the MPU on this board.



11-5 Band Decoder/ Frequency Counter PC1664

The band decoder decodes the various operating band data issued by the major brands of the radios (ICOM, Yaesu, Kenwood). With the decoded signal, the amplifier will automatically follow the frequency band of the radio.

With these three manufacturers, there are four kinds of band data used in their latest radio models, i.e. DC voltage, 4 bit TTL, RS-232C, and serial data. HL-1.5KFX is designed to meet any of these methods, if matched cable is connected respectively.

The MPU has the frequency counting function also. RF drive signal from the transceiver is sampled and divided by 16 (PC1675), and then reaches the input of the MPU.

Under the manual band select mode, if the frequency of RF drive and band setting of the amplifier do not match each other, MPU will judge band mis-set to issue the amplification “halt” command (shut down).

