

2. System Basic Features

2.1 PDH System

PDH system is different from the traditional microwave equipment in smaller size, lighter weight, easy set up and can be conveniently moved from place to place. The main characteristics lie in its advantageous use of high frequency band microwave transmission (above 5.7GHz frequency), digital transformation, concise structure, quick connection and adapt to complex topographical structure. Extensively use in mobile phone base station's interconnection and signal transmission, short distance local connection, urgent communication, public and specialized network has large application as well. The present wireless low frequency band is jam-packed and with the demand to build a quicker communication network, the use of high frequency band PDH equipment connection is especially meaningful.

2.2 Core Technology

PDH system includes a lot of high technique, which are:

- (1) High RF microwave and other related components (amplifier, LNA, MIX, duplexer etc.)
- (2) Frequency integrator randomly changes to different frequency band
- (3) High amplifier gain control technique (ALC & ATPC)
- (4) Advanced QPSK de/modulation
- (5) Microwave frame de/multiplexer
- (6) Digital band limit
- (7) Digital equalizer
- (8) Forward Error Correction
- (9) Random $N \times E1$ de/multiplexer, where $N=1\sim32$
- (10) Digital cross-connection
- (11) Computer monitoring and signal communication
- (12) Network management
- (13) Digital service
- (14) Digital interface transformation
- (15) Highly efficient and improved overall design

- ※ Audio frequency: Each voice signal needs a 64kbps; made of 8 bits-per-sample code, A/D and D/A conversions.
- ※ E1 is an European Standard, $1 \times E1$ is 30 voice channels, plus a channel for transmitting and signaling, i.e. $32 \times 64\text{kbps} = 2.048\text{Mbps}$

2.3 Composition and Principle

2.3.1 System Composition

PDH system is composed of ODU and IDU. Other set of equipments include antenna system, end- terminals etc.

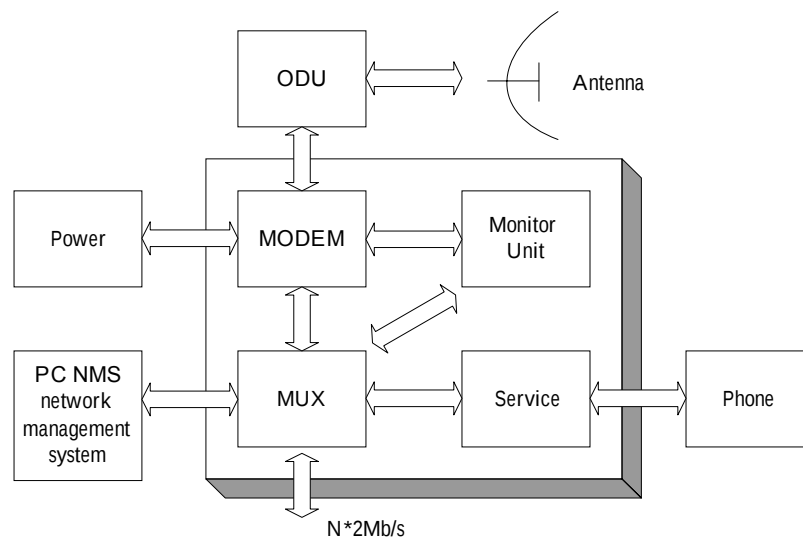
ODU unit is the Rx/Tx unit of microwave signal. It is composed of other microwave units (amplifier, converter, coded integrator etc.), duplexer, IF unit (dual converter, local oscillator, IF processing segment etc.), monitor unit, remote unit, and power board.

IDU unit mainly comprises of QPSK modulator, de/multiplexer, monitor unit, network management system, digital service, power system, other interfaces etc.

Antenna systems include antenna, matching connection, transformation and other installation assembly for fixing on the rooftop.

ODU unit and IDU unit are connected by an IF cable.

PDH System Block Diagram (1+ 0 mode)



2.3.2 System Principle

N number of E1 signals, digital service, 9600b/s system net control and 9600b/s computer data communication etc. multiplexed in a multiplexer to a specific microwave frame code. After QPSK modulation, the system sends the transmission to the ODU through only one IF cable. It enter the ODU upstream IF signal communication through equalized electric circuit interface, higher frequency converter, power amplifier, filter, duplexer and are then transmitted out through the antenna system.

After the opposite terminal's antenna system receives the microwave signals, it is passed on to the duplexer, LNA, low frequency converter, filter, dual frequency converter and then to the IDU. In the IDU, it passes through the QPSK demodulator to recover the microwave frame signal. This frame signal is then processed through de-multiplexer to recover the N number of E1 signal and other service signal.

The monitor unit in the equipment is controlled by the CPU (central processing unit) to function as: monitoring, controlling, dispatching, alarming, processing and indicating signals etc. Based on the statistical result of BER test in de/multiplexer, we have $1E-3BER$, $1E-6BER$ and frame loss signals.

Digital service adopts the Analog rule of 64kbps and PCM (Pulse Code Modulation) decoder method to service communication, complete address selection and full address function. Through simulation transmitting and receiving, to complete the multiple categorized public affairs connection. The dialing mode adopts DTMF system.

System network management uses PC machine of above PII operating system.

Under WINDOW environment's SNMP network management software, it is possible to hold communication through the same equipment, collect all the equipment's status in the network and select records for printing. The introduction of animation design makes the network topology and equipment selection status crystal clear.

3. Technological Characteristics

Traditional digital microwave equipment generally transmits E1 signal only, so there is always the need to apply for frequency channel because of technological limitations.

In recent years, there is a dramatic change in the structure, composition and application of digital microwave communicative equipment. The traditional system of transmission has been changed to the integration of transmitter and receiver as well as from fixed frequency to the possibility of frequency conversion from low to high frequency band. In view of the high frequency digital microwave communication system's new changes and additional newer characteristics, we had already improved the traditional system to a great length.

K-Best's PDH system has the following technological characteristics:

- high frequency band: 5.8 、 13 、 15GHz to 26GHz
- complete capacity: 2*2Mbps 、 4*2Mbps 、 8*2Mbps 、 16*2 Mbps
- flexible interface: suitable for multiple network and business connection
- IDU and ODU unit connected by a single IF cable up to 300m length, thereby, decreasing the RF transmitting loss and increasing the receiving signal-to-noise ratio (S/N)
- channel conversion, flexible spread network and least backup support
- digitally advanced QPSK or 16QAM de/modulation
- powerful monitoring function: simple and easy to operate LCD display. With the overall status display and loopback test function, subscribers can easily maintain the system without the need of special equipment to ascertain where malfunction has occurred
- improved SNMP network management system suit a lot of different topological structure. It can manage up to 255 number of station equipments and also extend the monitoring support to other microwave equipments
- quick and easy installation
- equipment adopt a considerable amount of advanced technology and modularity to design the structure which is highly reliable, small, artistic, quick to produce and easy to maintain.
- frequency bandwidth and spectrum transmitting RF spurious fits the specifications