

JUL-6226

Operational/Technical Description



Japan Radio Co., Ltd.

1. AP

1.1 AP-RFU

1.1.1 Overview

The AP-RFU consists of three blocks: Antenna section, RF section and IF section.

- **Antenna section**

The omni-directional antenna (with horizontal directivity of 360°) and the horn-type antenna (90° × 10° directivity) give same shapes of AP-RFU.

- **RF section**

In the RF section, the transmission IF signals are up-converted into 24-26 GHz-band RF signals using the local signal, which is generated by multiplying the 2.4 GHz synthesized oscillator. The next-stage BPF eliminates unwanted sideband components. The up-converted 24-26 GHz-band RF signals are amplified up to the desired level then fed to the antenna via the TDD-Switch and the Waveguide Filter.

The received 24-26 GHz-band RF signals by the antenna are fed in to the LNA via the Waveguide Filter and the TDD-Switch. The output signals of the LNA are down-converted into IF signals using the local signal, which is generated by multiplying the 2.4 GHz synthesized oscillator. The BPF is employed to eliminate the image components (interference).

The TDD Switch selects the transmitting or receiving function. Detection of the transmitting burst at the IF section turns the switch to the transmitting side.

- **IF section**

In the receiving IF section, the output level to the AP-IFU is adjusted by the automatic gain control (AGC) function, so that the input level of the AP-IFU does not saturate for the reception of the WT signal which gives highest receiving level. The SAW filter eliminates the adjacent channel interference.

In the transmitting IF section, the detection of the transmitting burst signal control the TDD-Switch in the RF section to turn it to the transmitting side. The SAW filter provides the signal delay for the period of the burst detection and the TDD-Switch turning time, as well as the elimination of the non-desired signal component.

The IF section also has the compensation functionalities for cable losses between the AP-RFU and AP-IFU.

The CPU in the IF section performs the AGC, the cable loss compensation , and the monitoring and control functionalities.

Figure 1-1 is a block diagram of the AP-RFU.

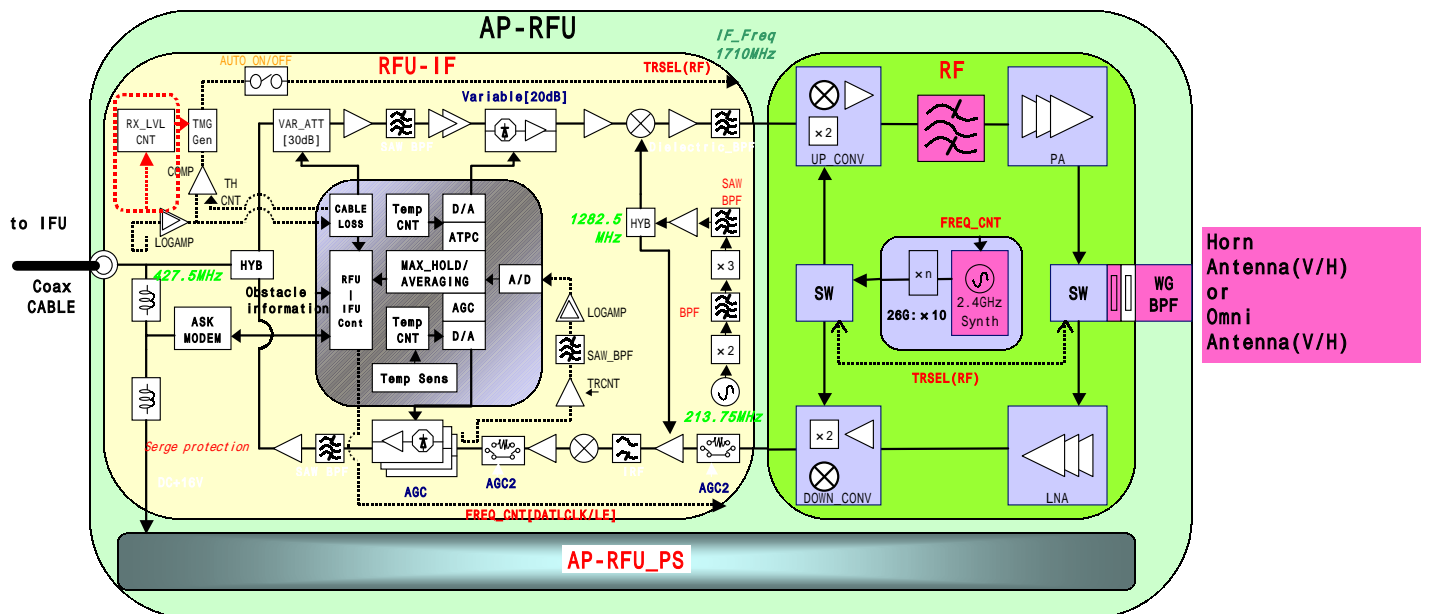


Figure 1-1 AP-RFU Block Diagram

1.1.2 Operations and Indications

The AP-RFU does not have any operation or indication panels.

1.2 AP-IFU

1.2.1 Overview

AP-IFU consists of three blocks: IF section, digital section and interface section.

• IF section

The transmission IF section performs quadrature modulation of 427.5MHz IF frequency according to the transmission output from the digital modem installed in the WT-ASIC.

In the receiving IF section, the received burst signal level is adjusted by the automatic gain control (AGC) function of the digital modem. The quadrature demodulator down converts the received IF signal into the base band signal.

The digital section consists of a digital modem, TDD/TDMA framer, wireless MAC processor, and system controller. These functionaries are equipped in the WT-ASIC.

The digital modem performs modulation and demodulation of transmitting and receiving burst signals.

The interface section has an interface between the AP and the upper unit (100BASE-TX). It provides a 100BASE-FX interface by installing the AP optical INTF unit.

The digital section consists of the wireless MAC processor, TDD/TDMA controller, modem and system controller. The wireless MAC processor converts between the Ethernet frames that the interface section handles and wireless MAC

frames. It also schedules the dynamic slot assignment. The TDD/TDMA controller performs scrambling, encryption, error correction and other processing. The system controller performs operating parameter setting, state monitoring, control and testing for the modem, TDD/TDMA processor, wireless MAC processor and network interface. It also sends and receives maintenance signals via SNMP. It performs delay control, authentication and other procedures, operating parameter setting, state monitoring, control and testing for the subordinate WTs over a DMF channel.

The transmission IF section in the IF section performs quadrature modulation for the transmission base band signals at 427.5MHz LOC frequency for up conversion to IF signals. It also controls the output level to the desired level based on the control from the ASIC. The receive IF section equalizes the level of the reception waves arriving in a wide level range using the automatic gain control (AGC) from the ASIC, and then down converts them into base band signals.

Figure 1-2 is a block diagram of the AP-IFU.

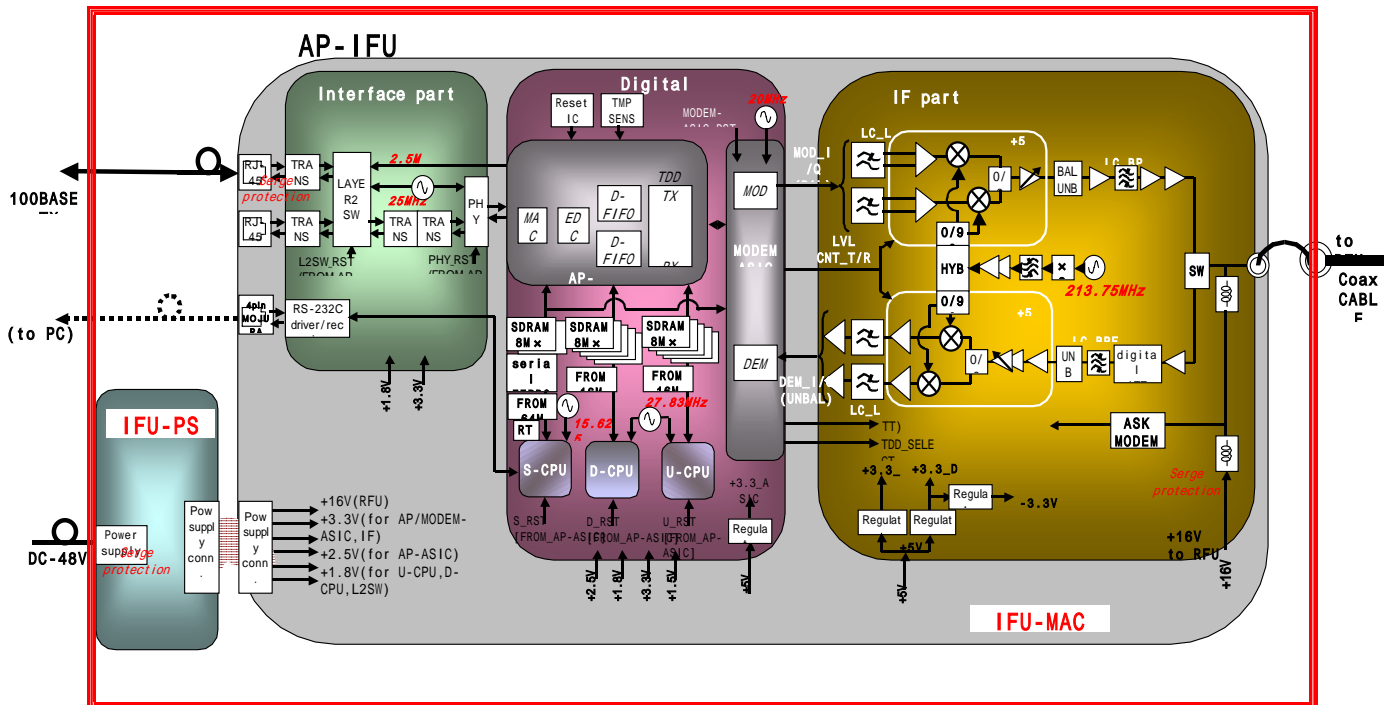


Figure 1-2 AP-IFU Block Diagram

1.2.2 Operations and Indications

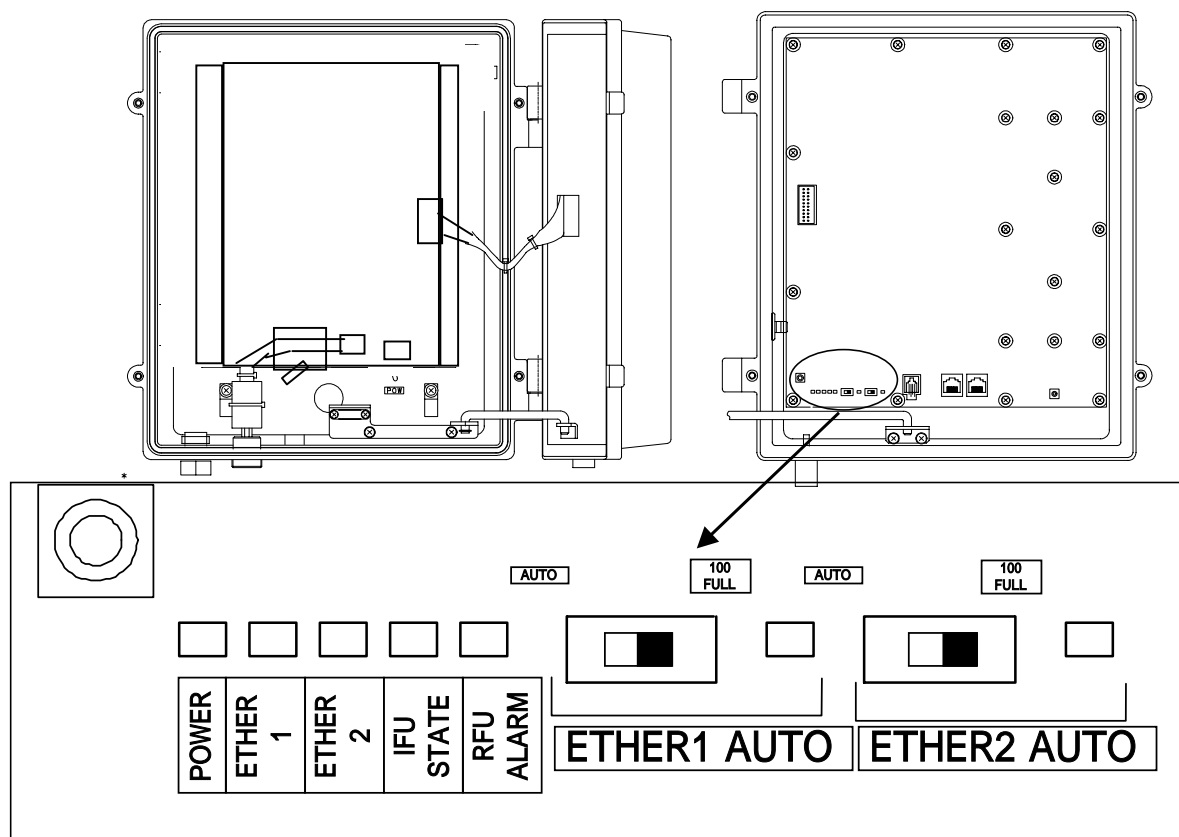


Figure 1-3 AP-IFU Operation and Indication Panel

Table 1-1 AP-IFU Indications

	LED	State indication
①	POWER	Lit green: Power on Extinguished: Power off
②	ETHER 1	Lit green: ETHER link established Flashing green: ETHER signal sent or received Extinguished: ETHER link down (See Table 3-3, 4)
③	ETHER 2	Lit green: ETHER link established Flashing green: ETHER signal sent or received Extinguished: ETHER link down (See Table 3-3, 5)
④	IFU STATE	Lit red: IFU alarm (See Table 3-3, 2) Flashing green: Normal (CPU running) Flashing orange: During initialization
⑤	RFU ALARM	Lit red: RFU alarm (Cause: RFU failure (See Table 3-3, 1) or communication error between the IFU and RFU (See Table 3-3, 3)) Extinguished: RFU alarm cleared
⑥	ETHER1 AUTO	Lit green: AUTO (ETHER1 AUTO switch set to AUTO) Extinguished: 100BASE full duplex
⑦	ETHER2 AUTO	Lit green: AUTO Extinguished: 100BASE full duplex
⑧	RST	Unit reset switch

Table 1-2 AP-IFU Controls

	Switch	Description
1	ETHER1 AUTO (The shape of the switch may be changed)	Sets the ETHER1 interface (100BASE full duplex/AUTO). After changing the switch setting, you have to reboot the unit (power off and back on) to enable the new setting. AUTO: AUTO 100FULL: 100BASE full duplex (factory setting)
2	ETHER2 AUTO (The shape of the switch may be changed)	Sets the ETHER2 interface (100BASE full duplex/AUTO). After changing the switch setting, you have to reboot the unit (power off and back on) to enable the new setting. AUTO: AUTO 100FULL: 100BASE full duplex (factory setting)

Table 1-3 Alarm Issuance and Clear Conditions

	Item	Initial state	Issued when:	Cleared when:
1	RFU failure	Cleared	The RFU-CPU detects LOCALM or TRSELALM three times each for more than 10msec.	The RFU-CPU detects no LOCALM or TRSELALM three times each for more than 10msec.
			LOCALM (local oscillator alarm) occurs if the local oscillator lost synchronization.	Synchronization is recovered.
			TRSELALM (transmission/reception switchover SW failure) occurs if the transmission state continues for more than 1sec.	Only by a reset.
			IFU-CPU detects a RFU-IFU communication error (monitoring response).	IFU-CPU is cleared by a single RFU-IFU communication (monitoring response).
2	IFU failure	Cleared	Communication error among the S-CPU, D-CPU and U-CPU. No response to polling for 3sec	Cleared by a single response.
			L2SW setting failure If setting failed four times (once for transmission and 3 times for retransmission)	No recovery
3	Communication error between RFU and IFU	Cleared	The S-CPU detects a S-RFU-CPU communication error. No response to polling four times (once for transmission and 3 times for retransmission)	Cleared by a single response.
4	ETHER 1 link down	Issued	PHY link down 3 times each for 100msec.	Recovered from PHY link down 3 times each for 100msec.
5	ETHER 2 link down	Issued	PHY link down 3 times each for 100msec.	Recovered from PHY link down 3 times each for 100msec.