

the output signal is re-radiated and can cause interference to adjacent band users. This output power reduction is to be achieved by reduction of input power.

1-2
TABLE 1-2. Rated Power Output for Multi-tone Operation
(for Intermodulation Products 50 dB down)

Number of Tones	Level of Each Tone Input	Output
1	- 4.5 dBm	+ 18 dBm
2	- 13.5 dBm	+ 9 dBm
4	- 16.5 dBm	+6 dBm
8	- 19.5 dBm	+ 3 dBm
16	- 22.5 dBm	0 dBm

NOTE: Input level based on maximum gain limit.

SECTION 2. THEORY OF OPERATION

2.0 GENERAL

As explained in Section 1, the A181 is a bidirectional amplifier. It provides 21 dB gain with versions available for each of the cellular, GSM, and SMR bands. The block diagram of the A181 is shown in Figure 2-1.

2.1 - The unit is composed of two band splitters or diplexers, two independent amplifiers, an alarm and voltage regulation circuit. Examine the case where the base transmit signal enters the unit via J2 (the common port of diplexer U2). The signal passes through to U2's high band output port to drive amplifier AMP 2. The output of amplifier AMP 2 is fed into the high band input of diplexer U1 and then is output at J1.

2.2 - The diplexers U1 and U2 provide isolation between the transmit and receive amplifiers. The unit's operation in the base receive band is similar to the base transmit band discussed earlier.

2.3 - The bias condition of each device in the amplifiers is monitored. If the bias changes outside certain limits a fault condition is indicated. When a fault condition occurs the standard fault reporting unit transmits the unit identification (or "Fault Code") by two level amplitude modulation of a low frequency carrier placed on the cable center conductor. The signal is transmitted as a short burst repeated at approximately 1 to 2 minute intervals while the fault condition persists. The fault code can be programmed as described in Section 3.2.

2.4 - The voltage regulator takes 15 - 32 VDC input and provide 12 VDC output. It delivers about 250 mA during normal operation. A zener diode provides transient protection against voltage spikes on the cable.

2.5 - The bidirectional amplifier requires external DC power to be supplied through either one of the two N receptacles or from an external local power source. Internal jumpers are used to select whether DC current is drawn from J1, J2 or both. If configured to draw current from J1 or J2 then the unit will only pass RF between J1 and J2. Otherwise the unit will pass both DC and RF. When configured as a local powered unit, DC is blocked to both J1 and J2. Section 3.2 provides details on how to set up these jumpers.

2-1

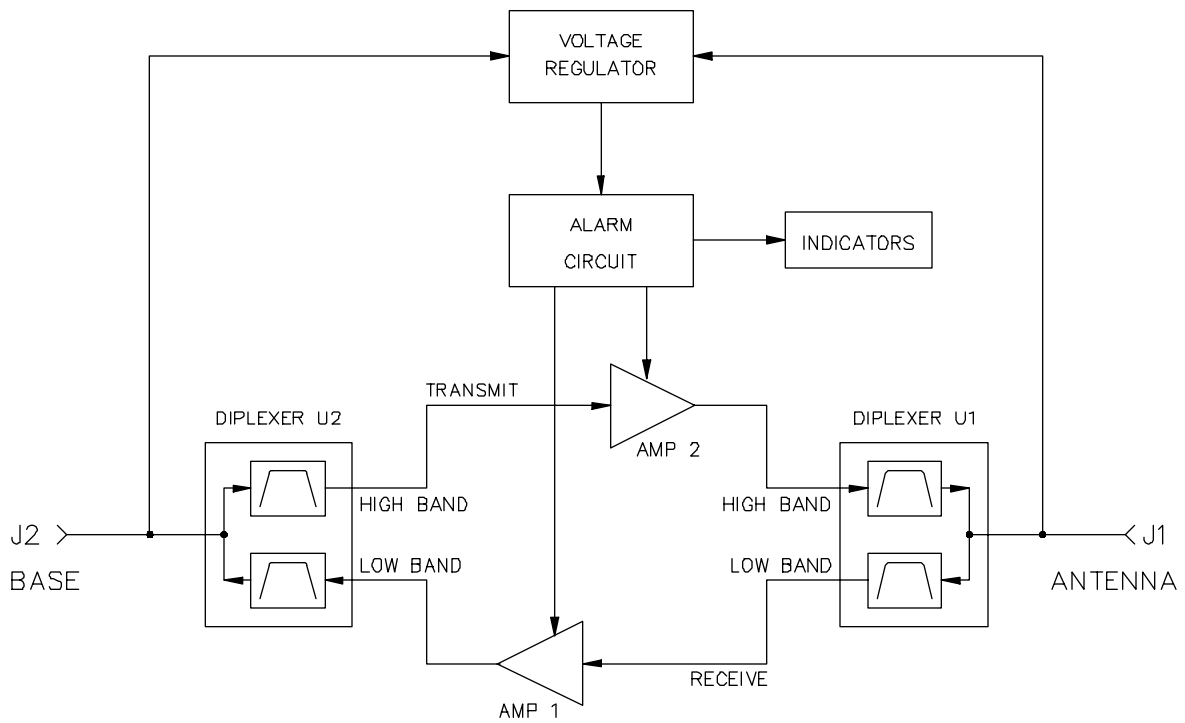


Figure 2-1 A181 Bidirectional Amplifier - Block Diagram

2-2

SECTION 3. INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS

3.1 UNPACKING AND INSPECTION

The following checks are recommended after receipt of the equipment from shipping agent:

1. Check for any external damage that could have occurred in transit. If damage is found, report to the shipping agent and to the supplier immediately.
2. Check that all items on the packing slip are present. If any are missing, report to the supplier immediately.

3.2 INSTALLATION

The bidirectional amplifier is designed for mounting on a flat surface. The unit can be mounted in any orientation as desired although it is practical to select a mounting position which allows the indicators to be seen. Proceed as follows:

STANDARD FAULT REPORTING UNIT:

1. Locate a suitable mounting location, allow a clearance of at least 5 inches (13 cm) to route mating cable and connectors to the unit. Drill four pilot holes on a 7.5" x 4" center for No.10 fasteners.
2. Connect J2, "BASE" to the cable leading to the base transmitter.
3. Connect J1, "ANTENNA" to the cable leading to the antenna(s).
4. If the A181 is to pass DC down the line no further action is required. Go to step 9.
5. Remove the base plate of the amplifier.
6. Locate the three removable jumpers on the PCB. These are labeled 'J1', 'DC' and 'J2'.
7. If power is drawn from J1 then remove jumper 'J2'. Go to step 9.
8. If power is drawn from J2 then remove jumper 'J1'. Go to step 9.
9. If the factory set "Fault Code" is acceptable this completed the installation.
10. If reprogramming of the fault code is required refer to Appendix A.
11. Reinstall base plate and fasten the unit to the mounting location using No.10 hardware.

3-1

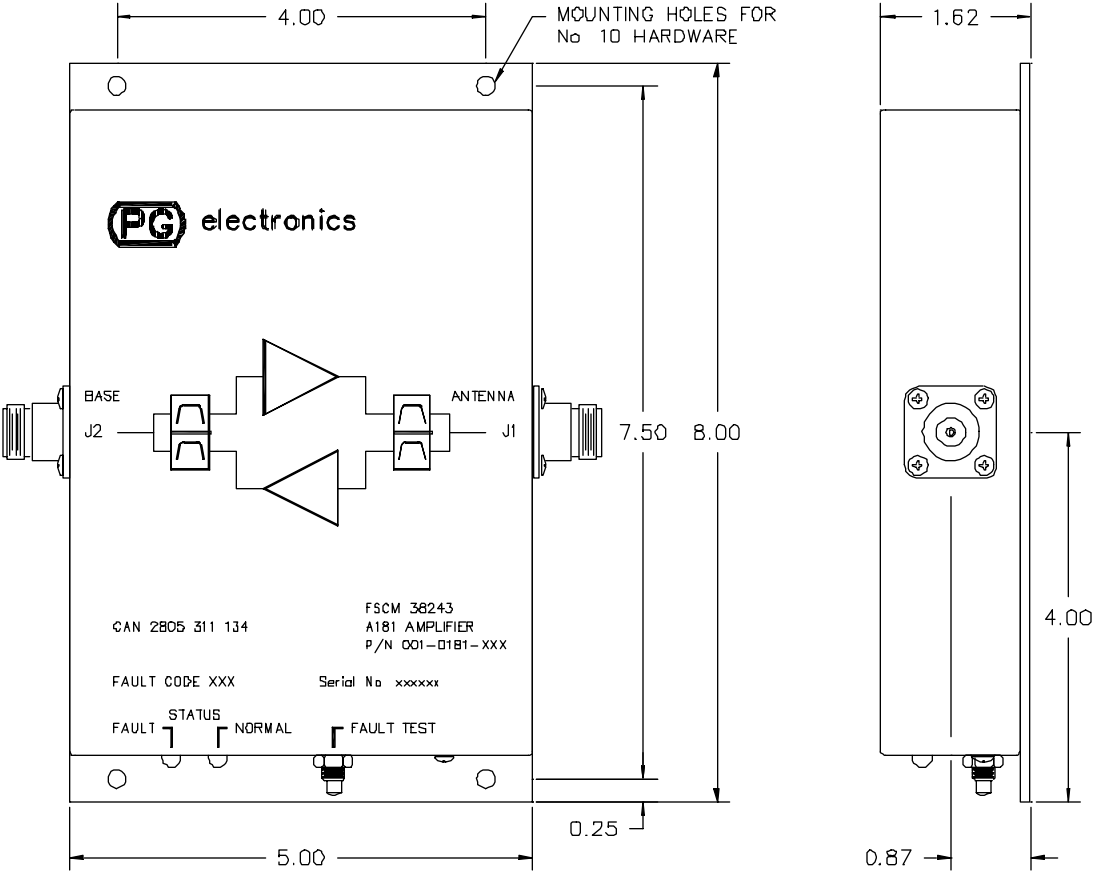
LOCAL POWERED UNIT:

1. Locate a suitable mounting location, allow a clearance of at least 5 inches (13 cm) to route mating cable and connectors to the unit. Drill four pilot holes on a 7.5" x 4" center for No.10 fasteners.
2. Connect J2, "BASE" to the cable leading to the base transmitter.
3. Connect J1, "ANTENNA" to the cable leading to the antenna(s).
4. Connect the unit to the DC power adapter. The unit can be powered from voltages in the range 15 – 32 VDC. The connector is center positive.

3.3 OPERATING INSTRUCTIONS

The A181 bidirectional amplifier has no external controls. When powered the unit will amplify signals in the transmit and receive bands.

When the green light is on, current consumption of each of the active devices in the RF paths are within specifications. The red light goes on whenever (1) one or all active devices in the RF paths failed or (2) the amplifier is being driven into saturation. Corrective action for (1) is to service the amplifier and (2) is to reduce input power to the limits given in Table 1-2.



CONNECTOR REFERENCE	SIGNAL DESCRIPTION	TYPE
J1	BASE RECEIVE INPUT BASE TRANSMIT OUTPUT DC INPUT/OUTPUT	N
J2	BASE TRANSMIT INPUT BASE RECEIVE OUTPUT DC INPUT/OUTPUT	N

TM0018A/M018A3F1

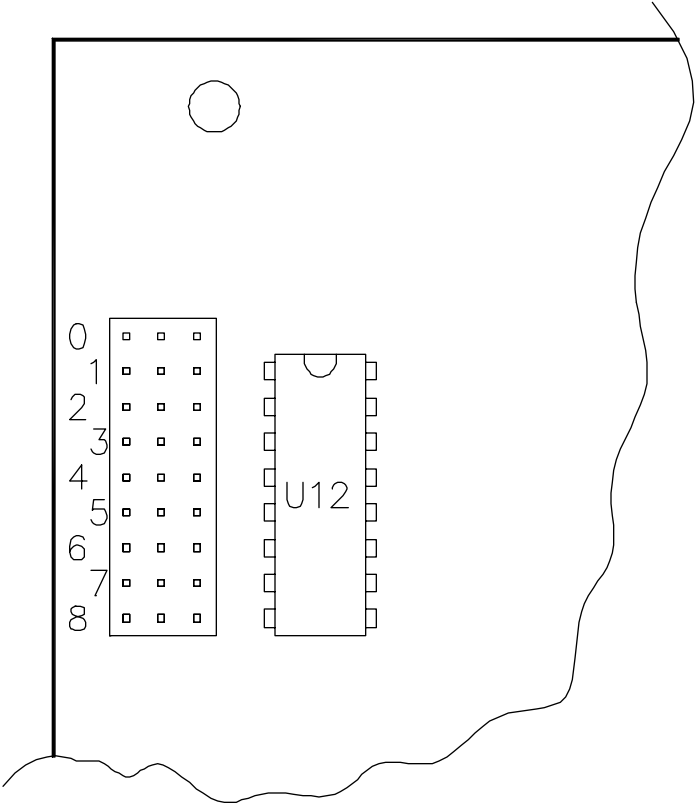
Figure 3-1. Installation Data

APPENDIX "A"

FAULT CODE REPROGRAMMING

If it is required to change the factory set Fault Code to the operator's custom plan then follow the following steps:

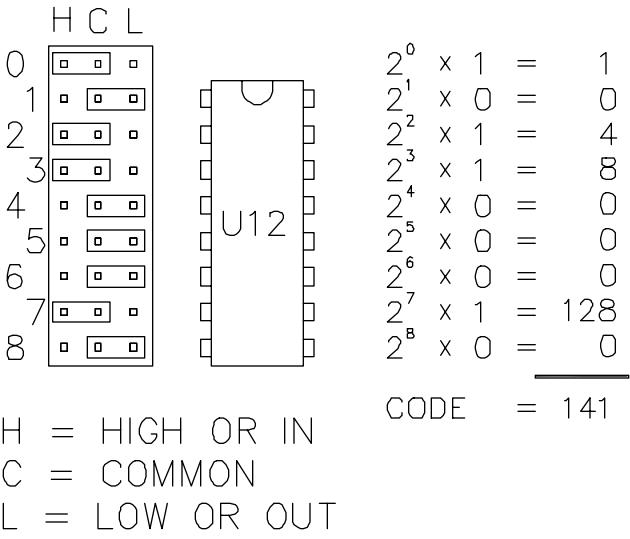
1. Remove the cover plate (ensuring that all hardware is retained).
2. Refer to the jumper field with a block of nine jumpers labeled 0 to 8 in Figure A1.
3. The code is programmable in binary with the numbers 0 to 8 representing the power of 2, i.e., the 3 jumper is $2^3 = 8$. When the jumper is close to the edge of the PC-Board the count is included. When the jumper is towards the center of the neighboring IC the count is zero for that binary digit.
4. Before reprogramming check the examples, Figure A2, and examine the factory set code as a starting point.



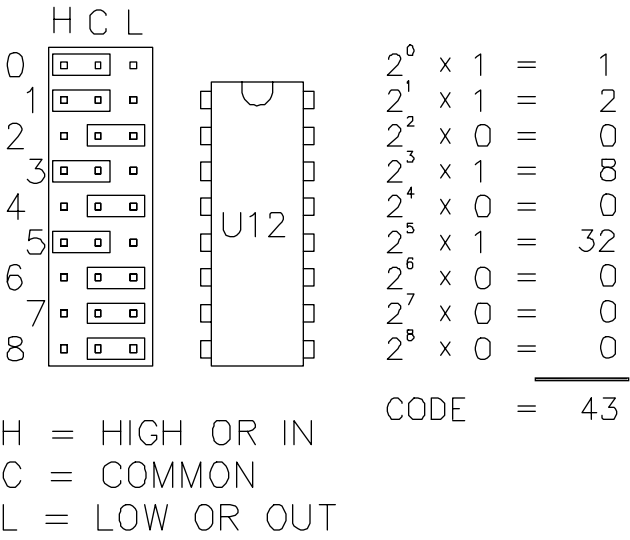
TM0018A/M018AAF1

Figure A1. Fault Code Area of A181 Amplifier.

EXAMPLE 1:



EXAMPLE 2:



NOTE: DO NOT SET FAULT CODE ABOVE 199.
FAULT CODES ABOVE 199 ARE RESERVED

TM0018A/M018AAF2

Figure A2. Fault Code Setting Examples.

