MPF Technologies

MPF-001

Installation and Operations Manual

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1. General Information

1.1 Introduction

This manual provides information pertaining to the installation and operation of MPF Technologies' MPF-001 "Compact Outdoor" repeater. This unit is designed to operate in the 1900 MHz band and the frequency allocation is listed in Table 1-1. This repeater will work for CDMA, TDMA and GSM modulations.

<Table 1-1: MPF-001 Repeater>

Model Number	Down Link* Frequencies	Up Link** Frequencies	Modulation
MPF-001	1950 ~ 1965, 1970 ~ 1975 [MHz]	1870 ~ 1885, 1890~1895 [MHz]	CDMA, GSM, TDMA

*: Down Link (= Forward Path) is from the BTS (Base Station) to the mobile
**: Up Link (= Reverse Path) is from the mobile to the BTS (Base Station)

1.2 Specifications

Frequency Range (MHz)	Down Link	1950 ~ 1965, 1970 ~ 1975 [MHz]
	Up Link	1870 ~ 1885, 1890~1895 [MHz]
Output Power Range (dBm) (max)		15 [dBm] @ 1 channel 10 [dBm] @ 2 channels 7 [dBm] @ 4 channels
Input Power Range (dBm)		-35 [dBm] Max.
Gain (dB)		45~60 / 45~60 [dB] (Adjustable 15dB, 1dB step)
Gain Flatness (± dB)		± 2 [dB] (or 4 dB peak to peak)
OIP3 (dBm)		> +30 [dBm]
Shutdown Level		≥ +17 dBm
Noise Figure (dB)		≤ 6 [dB] @ Max Gain
Group Delay (uS)		≤ 5 [uS]
VSWR		≤ 1.5:1
Impedance (ohm)		50 [ohm]
Spurious (Freq/dBc)		Meets FCC specifications (radiated and conducted). Conducted: ≤ -13 dBm @ 30 MHz ~ 10 GHz, Radiated: ≤ 43 + 10 log (P) dB @ 30 MHz ~ 10 GHz
Status LED		Power: GREEN, Fail: RED
Alarm Port		The interface can be an analog +5V circuit that goes off when the system looses power or stops transmitting an RF signal.
Alarm Signal Format		Normal: 0 V, Abnormal: +5V (TTL)
Connector Type & Pin Map		9 Pin D-SUB (M): 2. TX Alarm, 3. RX Alarm, 5.GND, Other Pins. N/C
Power Supply		External AC/DC Adaptor 6 [V] / 1.2A (Typ), 1.5A (Max)
Dimension (W x H x D, inch)		5.55 x 6.34 x 1.65 inch
Weight (Pounds)		3.3 lbs
RF Connector Type (Input, Output)		N-type Female, N-type Female
Operating Temperature (°C)		-5 to 40 [°C]
Cooling Method		Convection

1.3 Description

This repeater is designed for outdoor purposes (e.g. light poles, utility poles etc.) and will improve the PCS communications signal by extending the coverage of a base station.

2. Installation

2.1 Introduction

This section provides information for the installation and setup of the MPF-001 repeater. The information consists of procedures for unpacking, inspection and preparation for the actual installation as well as the setup.

2.2 Unpacking and Inspection

Examine the shipping carton for damage before unpacking the unit. If the shipping carton is damaged, try to have the carrier's agent present when the equipment is unpacked. If visual inspection reveals physical damage(s) to the equipment, you should send it back for replacement.

2.3 Preparation for Use

2.3.1 Power Requirements

The power supply of the MPF-001 accepts 6 VDC / 1.2 Amperes. Power consumption of the MPF-001 repeater is approximately 7.2 Watts.

2.3.2 Operating Environment

The MPF-001 is intended for outdoor use only. For normal conditions, the environmental conditions should be as follows:

Temperature range: -5 °C ~ 40 °C

2.4 Before Installation

You will need to determine the following before beginning the MPF-001 installation:

a. Base station location
b. Location where the donor antenna is to be installed
c. Location where the server antenna is to installed
d. Location where the MPF-001 repeater is to be installed
e. Length and type of coaxial cable needed to connect from the donor antenna to the repeater unit

f. Length and type of cable needed to connect from the repeater unit to the server antenna

2.5 Antenna Installation

2.5.1 Donor Antenna

Select a site where the signal strength from the base station is sufficient enough. Using a coax cable, connect the antenna to the repeater. If you are using a directional antenna such as a Yagi type, the antenna should be installed so that it is in the line of sight of the base station. Then, align the directional antenna toward that direction, and secure the antenna using provided mounting hardware.

2.5.2 Server Antenna

Using a coax cable, connect the antenna to the repeater. For this type of antenna, it is usually recommended to use a Patch type since it requires a wider beam width and less directivity.

2.6 Repeater Installation

MPF-001 is an outdoor repeater. This repeater can't be mounted outdoors by itself unless it is installed within an enclosure that meets all the environmental conditions.

2.6.1 Turn-On Procedure

Verify all RF connectors are tightened and cables and antennas are secured. Connect AC/DC adaptor on the repeater's DC Power IN connector. The Power indicator LED should turn Green once plugged in.

2.6.2 Antenna Isolation and Alignment

MPF-001 is equipped with an over drive protection circuit. If the output power level of reverse path (Up Link) exceeds prescribed limit, then reverse path is disconnected and the ALARM LED (RED) is on.

A. Antenna Alignment

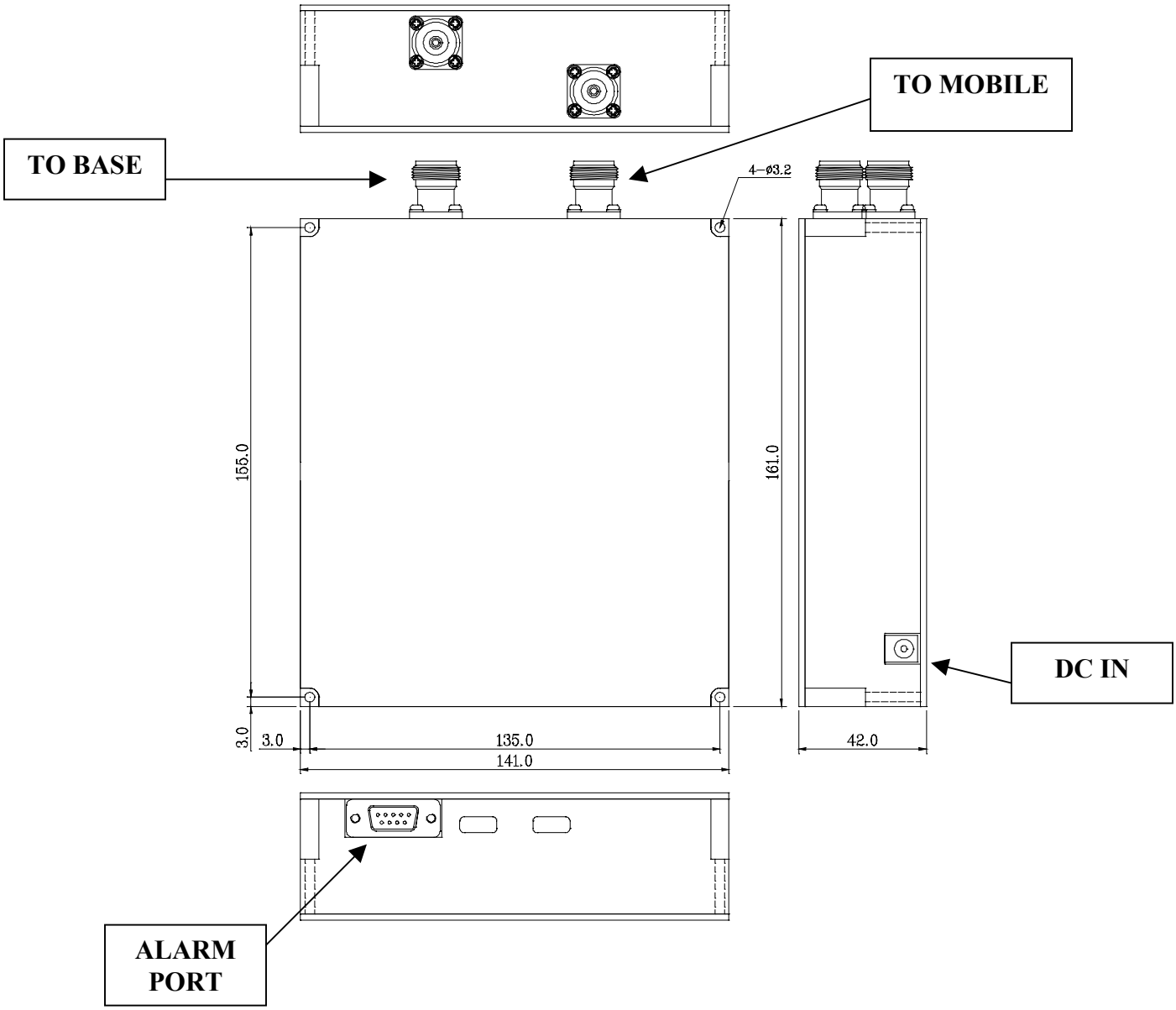
The donor and the server antennas needs to be mounted at least some specified distance away from each other, depending on the gains of the antennas. Otherwise, the repeater could go on oscillation and the repeater will shut down automatically and turn back on after a specified amount of time. Once the repeater is in oscillation, the RED LED will turn on.

2.7 Connectors

Figure 2-7 shows the connectors and Table 2-7 provides a description of each connector on the MPF-001 unit.

<Table 2-7: MPF-001 Connectors>

Label	Description
To BASE	N-Type female connector transmits base station RF signal, receives mobile RF signal, and connects to the donor antenna
To MOBILE	N-Type female connector transmits mobile RF signal, receives base station RF signal, and connects to the server antenna
DC IN	Connect AC/DC Adaptor for supplying DC power to the unit
ALARM PORT	9-Pin D-Sub male connector sends TTL signal to the receiving modem



<Figure 2-7: MPF-001 Connectors>

3. Operation

3.1 Introduction

This section provides information for operating the MPF-001 repeater.

3.2 Operating Instruction

3.2.1 Power-up

Connect the repeater to AC/DC adaptor. If the GREEN LED does turn on, the repeater is then operating properly.

3.2.2 Fail Status

There is one overdrive fail on the unit, for the up link. Over driving occurs when the RF output power of the repeater exceeds a prescribed limit. This means that the input RF power level is too high, or the repeater is oscillating. The condition may be transient, caused by various factors (e.g. due to a nearby base station, a nearby passing emergency vehicle emitting a strong signal etc.). It may also indicate low isolation between the antennas, which causes the unit to oscillate (please refer to the section 2.6.2 of this manual for antenna alignment and isolation).

The overdrive fail on the MPF-001 repeater is designed to detect whether the overdriving is transient or permanent. If the output power level of reverse (Up Link) exceeds prescribed limit, then reverse path is disconnected and the ALARM LED (RED) is on. Repeater automatically checks output power after a specified amount of time (10 seconds) when the reverse path has over power. If the reverse path still exceeds level then shut down mode continues for a specified amount of time (10 seconds). Once the ten seconds has elapsed, the reverse path is switched on again and it checks the output power level again. This process will take place a maximum of three times and after the third time, it will not turn back on automatically unless it's manually powered back on.

4. Trouble Shooting

If the repeater does not operate properly after installation, first make sure that the installation procedures as described in section 2 of this manual were followed correctly. Inspect each connection, both RF and AC, and connectors for a secure fit, checking to see if all the connections are made to the proper ports of the unit and the antennas.

If the malfunction is due to an alarm condition, refer to the appropriate part of the section 3.2 of this manual. Corrective actions may be taken for the overdrive alarms.

THERE ARE NO USER SERVICABLE PARTS IN THE MPF-001. DO NOT OPEN THE UNIT. THERE IS A DANGER OF AN ELECTRIC SHOCK. OPENING THE COVERS OF THE UNIT WILL VOID ALL WARRANTIES.

CAUTION

The Outside antenna must be positioned to observe minimum separation of 150 cm (~ 5 ft.) from all users and bystanders. For the protection of personnel working in the vicinity of outside (uplink) antennas, the following guidelines for minimum distances between the human body and the antenna must be observed.

The installation of an outdoor antenna must be such that, under normal conditions, all personnel cannot come within 150 cm (~ 5 ft.) from the outside antenna. In all installations, the antenna should never be mounted such that the main beam is directed toward an area where workers or bystanders may be present. Exceeding this minimum separation will ensure that the worker or bystander does not receive RF-exposure beyond the Maximum Permissible Exposure according to RF exposure requirement per FCC 1.1307 and 2.1093.