Mobile Communications

MPA
FLASH
PROGRAMMING

Programming Instructions

TABLE OF CONTENTS

INTRODUCTION

The radio operating system software for the microprocessor resides in a 64 kilobyte Flash Memory device. The Flash Memory allows easy reprogramming of the radio software for additional features and software upgrades without opening the radio or removing standard EPROMs. This manual provides instructions for using the Flash Program to update the system software in the MPA radio.

INSTALLATION

PC REQUIREMENTS

The following hardware and software is required to update the system software through FLASH Programming:

A. IBM PC XT, AT or any true compatible with MS-DOS version 3.0 or later and having the following minimum configuration.

    1. A single Disk Drive

    2. 640K Internal RAM.

    3. Serial Port.

B. Serial Programming Interface Module (TQ-3370 only) and RS-232 Cable (part # 19B235027P1).

C. Radio Programming Cable TQ-3311.

MAKING BACKUPS

The Flash Programming Software is provided on a single 5 1/4" diskette or a single 3 1/2" diskette. The diskettes are sensitive and fragile and should be handled with care and stored in a secure area.

Upon receipt of your diskette, copy the original software diskette to another diskette or a fixed disk and store the original in a safe place.

This ensures the availability of an accurate program should a copy fail during program execution.

SYSTEM HOOK-UP

Connect all peripheral equipment to your computer prior to configuring the Flash Programming Software. Remember to refer to the operating manuals of each device for correct installation.

If your system is already established, check to see that you have all the equipment necessary to execute the program (see page 3). Isolate all cables connecting computer to devices to prevent tangling, interference and damage.

Locate the serial port on the computer. This port is usually located on the back of the computer. Once located, examine the keyed plug on the RS-232 cable for the correct keyed end and insert it carefully into the appropriate serial port on the computer. If your computer uses a DB-9 connector, you will need to use a DB-9/DB-25 adapter cable from your local computer dealer. The other end of the RS-232 cable should now be inserted into the computer receptacle on the PC Interface Module (TQ-3370). The AC power supply for the interface box can be used, but is usually not necessary. The radio should be able to power the interface box through the UDC.

MPA Radio

Connect the programming cable (TQ-3311) to the PC Interface Module (TQ-3370) and to the radio as shown in Figure 1. After all connections have been made, switch on the power to the MPA.
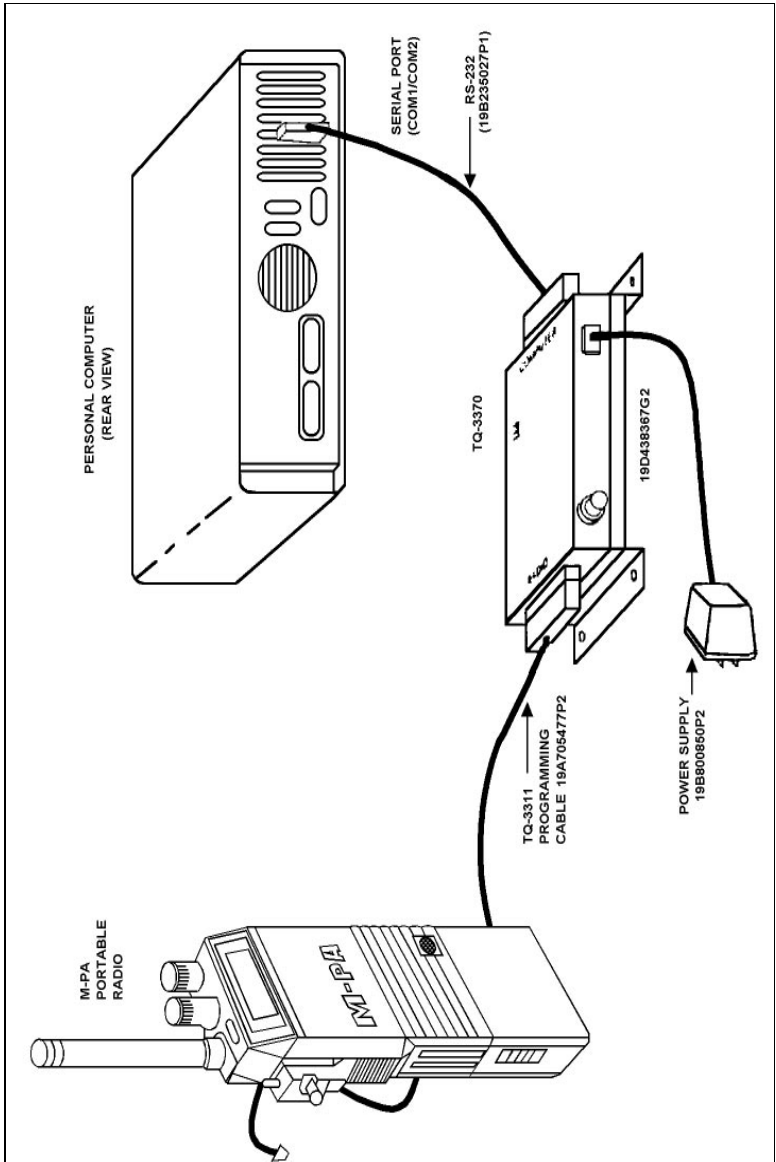
Figure 1-MPA Flash Programming System Hook-Up

LOADING THE SOFTWARE

NOTE

- Before the radio is Flash Programmed, the Personality should be saved out to a disk.

- Always use TQ-3370 Interface Box to Flash Program the radio. **DO NOT** use TQ-3310.

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1. Insert the Software Update Diskette into the appropriate drive.

2. Change to that drive.

3. If the PC Interface Module (TQ-3370) is connected to COM1 of your computer, type the following from the DOS prompt:

   MPA1 VER_XXXX.BPD <enter>

   where VER_XXXX.BPD is the filename of the data file to be flashed into the MPA. XXXX is the version number of the flash software contained on your disk. For example, a disk that contained version 9028 would require you to type:

   MPA1 VER_9028.BPD <enter>

   If the PC Interface Module (TQ3370) is connected to COM2 of your computer, type the following from the DOS prompt:

   MPA2 VER_XXXX.BPD <enter>

   where VER_XXXX.BPD is the filename of the data file to be flashed into the MPA. XXXX is the version number of the flash software contained on your disk. For example, a disk that contained version 9028 would require you to type:

   MPA2 VER_9028.BPD <enter>

   If it cannot find the .bpd file listed in the command line, the program will print an error message and exit.

4. The program's next step is to save the radio's personality. If the program fails to communicate with the radio, it will give a prompt to cycle the radio's power. If it still fails to communicate with the radio, pressing any key will cause the program to skip the personality step and proceed with the flash sequence. The computer saves the personality by using the radio's personality programming commands. This means that the radio must be running a valid version of software if it is to save the personality.

    If the radio software is corrupted, then the program will be unable to enter the radio's personality programming commands. In this case, the computer will hang with the message that it can't find the radio. If this occurs, press any key to proceed with the flash operation. Note that the personality will not be restored even if the radio flashes OK. The personality will have to be restored with the EDACS personality programmer program after the radio have been successfully flashed.

5. Once communication with the radio has been established, the computer will read the personality information from the radio and save it in memory. This allows the program to restore the personality should it be corrupted by flashing. **This is not a fail-safe method**. To be able to restore the personality requires the radio be properly flashed. If the radio flash is corrupted, the personality may also be corrupted. In this case, the personality would have to be restored with the EDACS personality programmer once the radio is properly flashed.

6. After the personality information is saved, the computer will turn on the programming voltage and wait a few watchdog periods for the radio to reset. After waiting, the computer will try to establish communications with the radio. If it cannot find the radio, it will prompt for cycling the power. At this point, pressing any key will cause the program to terminate.

> ### WARNING
> Aborting the program may corrupt the flash software residing in the radio.

If successful, the computer will tell the radio to zero out the flash part and then to erase the flash part. Each of these steps last approximately 10 seconds.

7. Once the erase step is complete, the computer sends the new software to the radio. A four hex digit address will be printed on the screen as the computer updates the radio. This process will take longer if the new radio software has to be read from a floppy. Flashing ends when the computer runs out of software to send to the radio.

8. After the radio has been flashed, the computer will once again try to establish communications with the radio. When it does, it will compare the personality information to that read into the computer before flashing on a byte by byte basis. If the personality has been corrupted, the computer will attempt to restore the personality to its pre-flashed state. Once the personality compare is finished, the computer exits to DOS.

9. The radio is now updated. Figure 2 provides an example of the information that should appear on the screen during a successful flash.

    After the radio has been Flash Programmed, *remove power to the radio* before removing the programming cable.

    If the radio has voice encryption features, it is good practice to keyload the radio. For it is possible for the flashing process to corrupt the key storage areas. The radio can now be returned to service.

```
c:\flash>mpa2 ver_9028.bpd

c:\flash>command /c dtr 2 1
dtr turned on

c:\flash>command /c rts 2 1
rts turned on

c:\flash>
c:\flash>flashmpa ver_9028.bpd -2

General Purpose 80C52 Flash Programmer Driver v1.0
By Tim Kemp, Dave Dumonsau


        Press any key to abort flashing !!

The com ports are running out of the Greenleaf libraries
Opening port COM2...

Radio is in programming mode
The current flash software revision is 9028
Personality size is 6k
Saving current personality
Comparing current personality
Current personality has been saved
Switching power with rts and dtr
Waiting out a couple of watchdog intervals.............

Zeroing flash part...
Erasing flash part...
Programming part...
Address :
        XXXX

Radio programmed
Turning off power with rts and dtr

Radio is in programming mode
Comparing current personality
The eeprom was not corrupted
Closing down port COM2

C:\FLASH>
C:\FLASH>command /c dtr 2 1
dtr turned on

C:\FLASH>command /c rts 2 1
rts turned on

C:\FLASH>

C:\FLASH>
```

Figure 2 - Program Screen

TROUBLESHOOTING

If the Flash Memory is unsuccessfully updated, the display on the MPA will blink. If this occurs review the following steps to isolate the problem.

1. The computer may not recognize that a radio is out there. The computer will display a message that it can not find the radio. This can usually be solved by cycling power on the radio. The power may have to be cycled several times.

2. The computer may interpret noise when powering up as a return parameter to a programming operation. In this case, the computer may set idle waiting for a step to complete that never started. The recovery in this situation is to press a computer key to terminate the program, cycle power on the radio, and run the flash program again.

3. There may be a problem with the programming voltage. The input voltage to the programmer's flash voltage regulator always comes from the radio. If the radio has a blown UDC PWR transistor, then the radio cannot be flashed. It may not be obvious that a given radio has a bad UDC power transistor. Check to see if the radio will accept the personality data without an AC adapter on the interface box. If it will not, it is quite likely that the power transistor has failed. In addition, a radio will not be able to handle a speaker mic if the power transistor has failed.

4. Cables are always a problem area. Review the System Hook-Up and Installation sections again. Check all cables to be sure they are properly seated in the connector. Try replacing the cables involved one by one to isolate a problem area.

> **NOTE**
> A <u>Rev. 1</u> TQ-3311 cable is necessary for flashing. An earlier Rev. 0 cable will not work. The Rev. 1 cable has a wire on pin 5 of the DB25 connector, while the Rev. 0 has a wire on pin 10. Moving the wire on pin 10 to pin 5 will allow the Rev. 0 cable to work for flashing.

Flash programming requires the DTR line from the serial port to the interface box. A simple 4 wire RS232 cable (1, 2, 3, 7) will not work. The use of the GE supplied 19B835027P1 cable is recommended.

One of the programs on the disk is a DTR program. It can be used to toggle the state of a ports dtr line. The form is

> *dtr n x*

Where *n* is the com port number and *x* is the desired direction. **x=1** turns dtr on, **x=0** turns dtr off. DTR should be checked on the interface connector.

5. The next step is to verify that the serial port and the interface box are working properly. This is accomplished by reading and writing personality information to a known good radio. This will verify the computer side of the serial port and the level conversion circuitry in the interface box. If this fails, isolate the computer's serial port by trying to use another serial device.

The interface box can be checked by trying to read or write a personality to a different type of radio. If this is successful, there may be a problem with the flash voltage regulator in the MPA. To check this, apply power to pin 6 of the radio side of the interface box. The level can be from 7.5 to 15 volts. The level (less about 1.2v for the drop across 2 diodes) should be on pin 8 of the radio connector. The box should be drawing about 50 mA. With the cable connected to the interface box, type a

> *dtr n 0*

command, where *n* is the desired com port. There should now be 12v on pin 5 of the radio connector. Next, type the command

> *dtr n 1*

The 12 volts on pin 5 of the radio connector should go away. A failure here indicates the interface box is bad.   Repair or replacement is necessary before flashing can continue.