

cable that is used with most of the mobile antenna kits). Do not route the cables close to each other since RG58A/U does not have a "perfect" shield. If the routing of the cables does not allow a physical separation of approximately 1" for each foot of length, then RG400/U double shielded cable should be used. Use the minimum length of cable that is necessary to connect the duplexer to the radios.

Never use RG58A/U, RG8A/U or RG213/U as the coaxial cable that connects the duplexer to the antenna. The single layer, bare copper, loose braid of the coax shield can result in noise generation by the output signal of the transmitter. The rather small size of RG58A/U can introduce excessive losses in the system that will decrease the effective range of the repeater. Substitute RG400/U for short lengths and RG214/U or 1/2-inch "hardline" for the longer lengths. If the "hardline" is used, then connect the duplexer to the end of the "hardline" with a flexible jumper cable to avoid undue stress on the connectors of the cables and the duplexer.

In planning a system, make sure that the various connectors found on the radios, duplexer, feedlines, feedline jumpers and antenna are the correct "mating pairs".

The chart shown in Table 1 on the following page can be used to determine which feedline to choose for a given frequency band and line length.

To further assist you, Table 2 provides a list of Motorola part numbers for the various connectors and cables which may be used.

### Antenna Spacing

Isolation between the the output from the transmitter and the input to the receiver may be obtained with physical distance. Instead of using a duplexer, two antennas may be spaced apart and connected to the "receiver" radio and the "transmitter" radio with separate transmission lines. The separation necessary to yield the desired 70 dB of isolation is dependent upon the frequency band of operation. It is obvious from the following charts that vertical spacing will get the 70 dB more easily than horizontal spacing. The horizontal spacing may be reduced

if buildings or hills or mountains are present between the antennas; the amount of reduction will have to be determined by experiment ("trial and error").

#### VERTICAL SPACING

FREQ (MHz)	SPACING	
	(ft)	(m)
30	295	90
40	220	68
50	177	54
150	59	18
170	52	16
400	22	7
470	20	6

NOTE: The two antennas will couple to a metallic support; the position of one of the antennas may have to be varied to obtain the desired isolation. Generally, the receive antenna is placed above the transmit antenna, for enhanced receive coverage from portable units.

#### HORIZONTAL SPACING

FREQ (MHz)	SPACING	
	(ft)	(m)
30	12,800	3,900
150	2,600	780
400	960	293

NOTE: The losses associated with long transmission lines have not been included in the calculations of the spacings. It is readily seen that horizontal spacing of antennas is somewhat useless; the cost of the transmission lines to the two antennas would be greater than the cost of a duplexer.