

## MONICOR Electronic Corporation

Alignment of 120 mW Radio Modems  
January 22, 1999

MONICOR ELECTRONIC CORP.  
FCC ID: GES4BAM2000S  
EXHIBIT #: 7A

### Test Equipment needed:

RF frequency counter \*  
Spectrum analyzer \*  
RF power meter \*  
\* Calibrated RF attenuator or load if needed for above  
ASCII terminal or PC running a terminal emulator  
SINAD meter  
Oscilloscope  
Regulated DC power supply  
RF signal generator  
RF cables/adapters as needed  
RS-232 cable w/ proper radio connector  
(including audio-test-point, and power if needed)

### Procedure:

#### General setup:

Set terminal to 9600 bps, no parity, 8 data bits, 1 stop bit.  
Connect terminal to radio using RS-232 cable.  
Connect oscilloscope and sinad meter to audio-test point.  
Calibrate the scope display for a 0 to +5 volt signal.  
Connect RF cable to radio antenna port. Use attenuator where  
equipment protection against excess power is needed.  
Set DC power supply to 7.5 volts for battery-run equipment,  
or 12.0 volts for "ME" (metal enclosure) equipment.  
Connect DC power to positive and ground as appropriate. The  
radio power-up message should be visible on terminal after  
a three-second self-test completes. The cursor should  
follow an asterisk prompt.

#### Mode control commands:

These must follow an asterisk (\*) prompt. Press the enter or plus (+)  
key to get a prompt if needed.  
To disable the transmitter of a controller ("base") so the  
receiver runs uninterrupted, enter 5 keystrokes:  
<P> <L> <Q> <zero> <Enter>  
This only needs to be done once until power is interrupted.  
To enable the transmitter, enter 8 keystrokes (lowercase):  
faerbtst  
followed by Ctrl-X (one keystroke).  
After the new prompt (Tx modulation:), a keystroke will  
choose the modulation and start the transmitter:  
n - none, unmodulated carrier  
f - full, carrier modulated at full rate  
h - half, carrier modulated at half rate  
The green lamp will turn on for the duration of the transmit test.  
One more keystroke (any key) will stop the transmitter and  
enable the receiver.



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Transmitter alignment:

Set frequency:

Connect frequency counter, using attenuator if necessary.  
Enable the transmitter with no modulation.  
Adjust L18 to set the transmit frequency within  $\pm 10$  Hz of  
the correct channel frequency.  
Disable the transmitter.

Check power output:

Connect the power meter.  
Enable the transmitter with no modulation.  
Verify that the power output is 120 mW  $\pm 20\%$ .  
Disable the transmitter.

Set deviation:

Connect the spectrum analyzer, using an attenuator if needed.  
Enable the transmitter with full modulation.  
Adjust R65 to set peak frequency deviation to 3 kHz by setting  
first side lobes relative to the carrier as follows:  
2400 bps radio -- first lobes 0 dB below carrier,  
4800 bps radio -- first lobes 10 dB below carrier.  
Verify that all harmonics are at least 40 dB below the carrier.  
Disable the transmitter.

Receiver alignment:

Set 1st LO frequency:

Connect signal generator (after disabling transmission).  
Set generator to channel frequency at -115 dBm, 400 Hz  
modulation with 3 KHz deviation.  
Adjust L7 (1st L.O.) to get equal cycle slipping at positive  
and negative edges of waveform on scope. Coarsely adjust  
L6 (discriminator) to avoid clipping at top or bottom of  
waveform.

Optional -- check crystal filter matching:

With signal generator as above, turn power up to +10 dBm.  
Adjust L4 and L5 (crystal-filter matching) to minimize  
distortion.

Set discriminator:

Set generator power down to -90 dBm and turn off modulation.  
Adjust L6 (discriminator) to get the desired audio DC voltage:  
1.8 volts for 4800 bps radio,  
2.0 volts for 2400 bps radio.

Check sensitivity:

Set generator modulation on 1 KHz with 3 KHz deviation.  
Adjust generator power to get a 12 dB SINAD reading. This  
level (sensitivity) should be -116 dBm or better.  
Adjust FL1 & FL2 (2 pole & 3 pole helical filters) to  
attain sensitivity.