```
% generate message
Ts = 1/1000;
t_max = 1.0;
t = 0:Ts:t_max;
W = 25;
to = 50e-3;
h = fir2(2*to/Ts,[0,0.25*W*2*Ts,W*2*Ts,1],[1,1,0,0])/Ts;
m = filter(h,1,randn(1,t_max/Ts+1))*Ts;

% AM modulate with pilot
fc = 200;
A = 1*max(abs(m));
s = (m+A).*cos(2*pi*fc*t);

% AM demodulate via envelope detector
Bp = W;
Bs = fc;
to = 10e-3;
b = firls(2*to/Ts,[0,Bp*2*Ts,Bs*2*Ts,1],[1,1,0,0])/Ts;
v = pi/2*Ts*filter(b,1,abs(s));

% plot results
figure(1)
 plottf(s,Ts);
 title('large-carrier AM')
figure(2)
 plottf(v-A,Ts,'t');
 hold on; hh = plottf(m,Ts,'t'); hold off;
 set(hh,'LineStyle','--','Color','Red');
 title('recovered signal')
```