

OVERVIEW A.P.T.

OVERVIEW SYSTEMS
P.O. BOX 130014
SUNRISE, FL. 33313
TIM HEFFIELD N4IFP
(305) 748-8315

OVERVIEW A.P.T. Satellite Converter

GENERAL INFORMATION

Thank you for purchasing OVERVIEW. Your P.C.B. has been carefully assembled and calibrated and should be operational with very little effort and time investment.

The OVERVIEW Converter is a hardware interface, that accepts the AMPLITUDE modulated information, transmitted directly from polar orbiting A.P.T.(Automatic Picture Transmission) satellites. Both U.S.A. and Russian satellites operate in this mode. The signal transmitted by these satellites is a VHF carrier (137.300 - 137.850 Mhz), this carrier is FREQUENCY modulated by a 2.4 Khz subcarrier. The subcarrier is then AMPLITUDE modulated by the video image information. Sounds complicated doesn't it? Well, it sounds more complicated than it really is. When this signal is received by an FM scanner or capable receiver, you end up with a 2.4 Khz audio tone. This tone varies in amplitude with the instantaneous brightness of the image.

The main purpose of OVERVIEW is to convert this AM audio signal into an FM audio signal, which is then compatible with equipment designed only for FM facsimile formats.

The OVERVIEW system was designed primarily to operate with the Black Belt Systems AVT SSTV/FAX equipment and the Commodore Amiga Computer. It is possible that the OVERVIEW converter will work with FM fax equipment other than the Black Belt system, but all of the features of OVERVIEW can only be fully realized when used with the B.B.S. AVT equipment.

Some of the features of the OVERVIEW system include:

- * Ability to record and playback satellite passes on an inexpensive stereo tape recorder. Video information is recorded on one channel and the sync. clock on the other.
- * Phase Locked Sync. Clock.
- * Automatic detection of the satellites as they pass.
- * Automatic start/stop of the tape, if desired (may require internal connections to the tape deck).
- * Automatic start/stop of a scanning receiver, if used (will require internal connections to the scanner).
- * Tape recording features can also be used with the B.B.S. AVT SSTV modes, HF weatherfax, and HF newsfax (previously not possible due to speed irregularities of cassette tape decks).
- * The OVERVIEW can control the scanner and tape deck independent of the computer. This means that the computer need not be powered up during satellite passes. This is especially helpful if computer generated RFI is a problem with your receiver.
- * The OVERVIEW converter can operate on the same regulated 12 VDC power supply as the AVT interface.
- * OVERVIEW is sold assembled and calibrated, as a single printed circuit board and can be mounted in the same enclosure as the AVT interface.
- * A level control that can be panel mounted is included to allow adjustment of overall image brightness independent of the receiver volume settings.
- * Two LED indicators are included, one indicates the presence of the 2.4 Khz satellite subcarrier and the other indicates that the sync. clock is phase locked.

OVERVIEW A.P.T. Satellite Converter

SYSTEM REQUIREMENTS

- 1.) OVERVIEW A.P.T. Converter P.C.B.
- 2.) Commodore Amiga 500, 1000, or 2000 computer, with at least 1 Meg. RAM, preferably more!
- 3.) Black Belt Systems, hardware interface and AVT software (preferably V 1.10 or above)
- 4.) Regulated 12 VDC power source, capable of supplying 162 ma.
- 5.) VHF FM scanner or receiver, 137.300 - 137.850 Mhz and having a minimum bandwidth of 37 Khz. The FM deviation of the satellite signal is too wide for normal narrow band scanners (NBFM), and will greatly distort video information.
- 6.) VHF Antenna system (simple turnstile ant. or sloping turnstile ant., as described in text supplied).
- 7.) Appropriate jacks and connectors for input/output of OVERVIEW, AVT, Receiver, and tape deck.

OPTIONAL EQUIPMENT

- 1.) Inexpensive stereo cassette tape deck. * Must have manual record level adjustments, CANNOT use tape deck with automatic level control.
- 2.) VHF preamplifier, which is mounted at the base of the antenna, such as the Hamtronics LNW-144. This greatly enhances the image quality, by increasing the signal to noise ratio, and increasing the usable length of the satellite pass.

* NOTE *

OVERVIEW is capable of operating with the GOES weather satellites also. The user must have access to 1691 Mhz receiving equipment, and the software must be capable of the 240 LPM mode (not available in V 1.10 of the AVT software, as of this writing, but coming soon!).

OVERVIEW A.P.T. Satellite Converter

SPECIFICATIONS

Power Requirements:

Input Voltage: Regulated 12 VDC.

Current Consumption:

No Signal: Aprox. 93 ma.

With Signal: Aprox. 162 ma.

Input Signal Type: 2.4 Khz Audio, Amplitude modulated by the video information (white level aprox. 100% mod., black level aprox. 4% mod.).

Input Levels:

RECEIVER AUDIO INPUT

Minimum level for white intensity: 100 mv RMS @ 2.4 Khz
(Level control full clockwise).

Minimum level for white intensity: 240 mv RMS @ 2.4 Khz
(Level control at midpoint).

Minimum level for satellite carrier detect: 50 mv RMS @ 2.4 Khz
(Level control does not affect carrier detect).

Maximum input level before clipping: 3.53 V RMS @ 2.4Khz

TAPE CLOCK INPUT

Minimum level for phase lock of sync. clock: 50 mv RMS @ 2.048 Khz.

FM Audio Output: .5 V P/P DC Coupled.

(White = 2300 Hz)

(Black = 1500 Hz)

Tape Control Switch Max. Ratings: 1 Amp @ 125 VAC

(Tape control relay has a second set of SPDT contacts, these contacts can be used for scan start/stop of a scanner, and are normally wired to the squelch control pin of the scanners microprocessor).

OVERVIEW A.P.T. Satellite Converter

HF FAX AND POLAR ORBIT A.P.T. FAX DIFFERENCES

The major difference between the HF FM fax modes and the polar orbit A.P.T satellite fax mode is that with the A.P.T fax a start signal and horizontal phasing information is never transmitted by the satellites. This is because the fax image is continuous and is transmitted throughout each entire orbit of the earth. This one factor is both fascinating and attractive to know, that you have the capability of receiving and displaying the images in real time just as the satellite "sees" them.

The images received by the polar orbiting A.P.T satellites consist of a visible light image side by side with an infrared image. The visible light images are high contrast pictures showing clouds, water, and land masses. whereas the infrared images are normally lower contrast showing only thermal differences.

Most of the NOAA A.P.T. passes during daylight hours are ascending (from South to North) over North America and will be received upside down, and backwards horizontally. This is easily corrected with the rotation gadgets in the Fax Window on the AVT control panel.

OVERVIEW OPERATION

Once all of the hardware connections are made according to the P.C.B. connections diagram, operation is fairly straight forward and basically the same as HF fax modes of the AVT system.

From an operational standpoint the lack of a transmitted start signal means that you must manually start the display of the image by clicking twice on the RECV gadget on the AVT control panel. One click to enter the receive mode, and the second click to bypass the start signal search mode. The lack of horizontal phasing information means that most likely the image will not be centered horizontally as display begins. Centering of the image can be accomplished one of two ways. First, during receive you can click the left mouse button at any time, and with each click the image lines to follow will be shifted a small amount to the left. The second method is to wait till the entire picture has been received and then use the left border gadget (the arrow pointing left with the red vertical line at the point) in the AVT Fax Window to set the border appropriately.

Audio output from the satellite receiver for OVERVIEW can be derived from several points on the receiver, but the most desirable point is one that is not affected by the volume control. This could be the receiver tape output jack if available or an internal connection to the "high side" of the volume control. A third possibility for the audio connection is the earphone jack or the external speaker jack. this works fine but the volume control setting cannot be changed during reception of a picture without affecting the picture brightness.

The setting of the OVERVIEW level control is VERY important since this directly determines the overall brightness of the received image. Set the level control as follows:

- 1.) If you're using the earphone or external speaker audio, and with the reception of a strong noise free signal

- set the receiver's volume control to a comfortable listening level and LEAVE it there.
- 2.) Turn the "Trig" function OFF and the "Tune" function ON in the AVT control panel.
 - 3.) While watching the AVT scope display adjust the OVERVIEW level control so that the vertical peaks just touch the scope graticle labeled "Wht".

The level control is now properly adjusted and "Recv" mode can be entered. While in the AVT Fax receive mode the level control can be "tweaked" to slightly lighten or darken the picture according to the users preference.

There are two methods of operation using the OVERVIEW converter to process and display AM fax images. The first method is in real time using the satellite receiver's audio directly. In this mode the OVERVIEW clock switch should be in the open position, this connects the normal AVT sync clock to the Amiga (the switch should also be in this position for all of the normal Black Belt Systems AVT operating modes). As the desired satellite approaches your location and the signal is received, the red LED should light indicating reception of the 2.4 Khz subcarrier. Simultaneously the relay should energize and hold. Even after the satellite audio disappears you will notice that the relay stays energized for about 13 - 14 seconds, this is to prevent the tape deck from stopping during momentary loss of signal. If desired the satellite pass can be recorded on a stereo cassette tape deck while displaying real time. To accomplish this use a "Y" connection to run the receiver audio output to the OVERVIEW rec. input and also to the right channel line input of the tape deck. The OVERVIEW tape clock output must also be connected to the left channel line input of the tape deck for recording. When making a recording the record level of the satellite audio (right channel) should set as high as possible without exceeding the 0 db mark on the deck's VU meter. The record level of the sync clock (left channel) should steady, and can be set some what lower than the 0 db mark. This will prevent any possible crosstalk between channels.

Once a satellite pass has been properly recorded OVERVIEW'S second mode of operation can be used, and that is displaying a prerecorded image. For operation in this mode the cassette tape deck's right channel line output is connected to the OVERVIEW rec. audio input. The left channel line output of the tape deck must also be connected to the OVERVIEW tape clock input. The OVERVIEW clock control switch should be closed for this mode. This allows the Amiga to be synced to the OVERVIEW generated clock instead of the normal AVT generated clock. As tape playback begins both of the OVERVIEW LEDs should light. The red one indicating satellite audio and the yellow one indicating that the sync circuit has phased locked to the tape clock audio. As noted in the P.C.B. connect diagram, relay contacts are available to control the start/stop of the cassette tape during record. If the tape deck you are using has a remote control jack your job of connecting these relay contacts will simply be a matter of acquiring the matching plug. If a remote control jack is not available you must break one of the connections of the tape deck's motor wires and connect the OVERVIEW tape control switch contacts in between. For convenience a small switch can be paralled with these contacts to bypass the OVERVIEW relay for normal tape deck operation.

AVT SSTV and HF fax images can be recorded in the same fashion as mentioned above. Simply connect the HF receiver audio to the tape deck's right channel line input in place of the

satellite receiver audio. The sync clock is still recorded on the left channel, and the OVERVIEW clock control switch should be open during record. Playback of the AVT SSTV and HF fax images is accomplished by connecting the tape deck's right channel line output DIRECTLY to the AVT receiver audio input, the OVERVIEW AM to FM conversion is bypassed for this mode. The OVERVIEW clock control switch should be closed during playback of the tape.

Multiple position rotary switches can be utilized to simplify the task of connecting and disconnecting various combinations of audio sources for record and playback. The design and wiring of these switches will be solely up to the user to implement, and is beyond the support capabilities of OVERVIEW Systems.

SATELLITE LIST

U.S.A.

NOAA - 9 137.62 Mhz Heard: 08:00 - 10:00, and 19:00 - 22:00 UTC
NOAA - 10 137.50 Mhz Heard: 00:00 - 02:00, and 12:00 - 14:00 UTC

U.S.S.R. (visible light images only, all satellites may not be active)

Met 2-14 137.85 Mhz Heard: 12:00 - 14:00, and 22:00 - 23:00 UTC
Met 2-15 137.85 Mhz Heard: 17:00 - 20:00 UTC
Met 2-16 137.40 Mhz Heard: 11:00 - 13:00, and 22:00 - 00:00 UTC
Met 2-17 137.30 Mhz Heard: 14:00 - 17:00 UTC

TRACKING THE SATELLITES

Several Public Domain programs are available for tracking satellites. Most were written for the amateur radio OSCAR satellites, and are spinoffs of the program written by Tom Clark - W3IWI. Many of the programs are written in BASIC and work fine with the polar orbiting weather satellites, simply enter the Keplerian elements for the satellite of interest. To obtain these programs check the Ham Radio and Amiga SIGS on Compuserve, you may also want to contact AMSAT/ARRL (Amateur Radio Satellite Corp.).

Another source of information is the Dallas Remote Imaging Group Datalink RBBS, telephone bulletin board. The phone number is (214) 394-7438, this is a good source for frequently updated Keplerian elements.

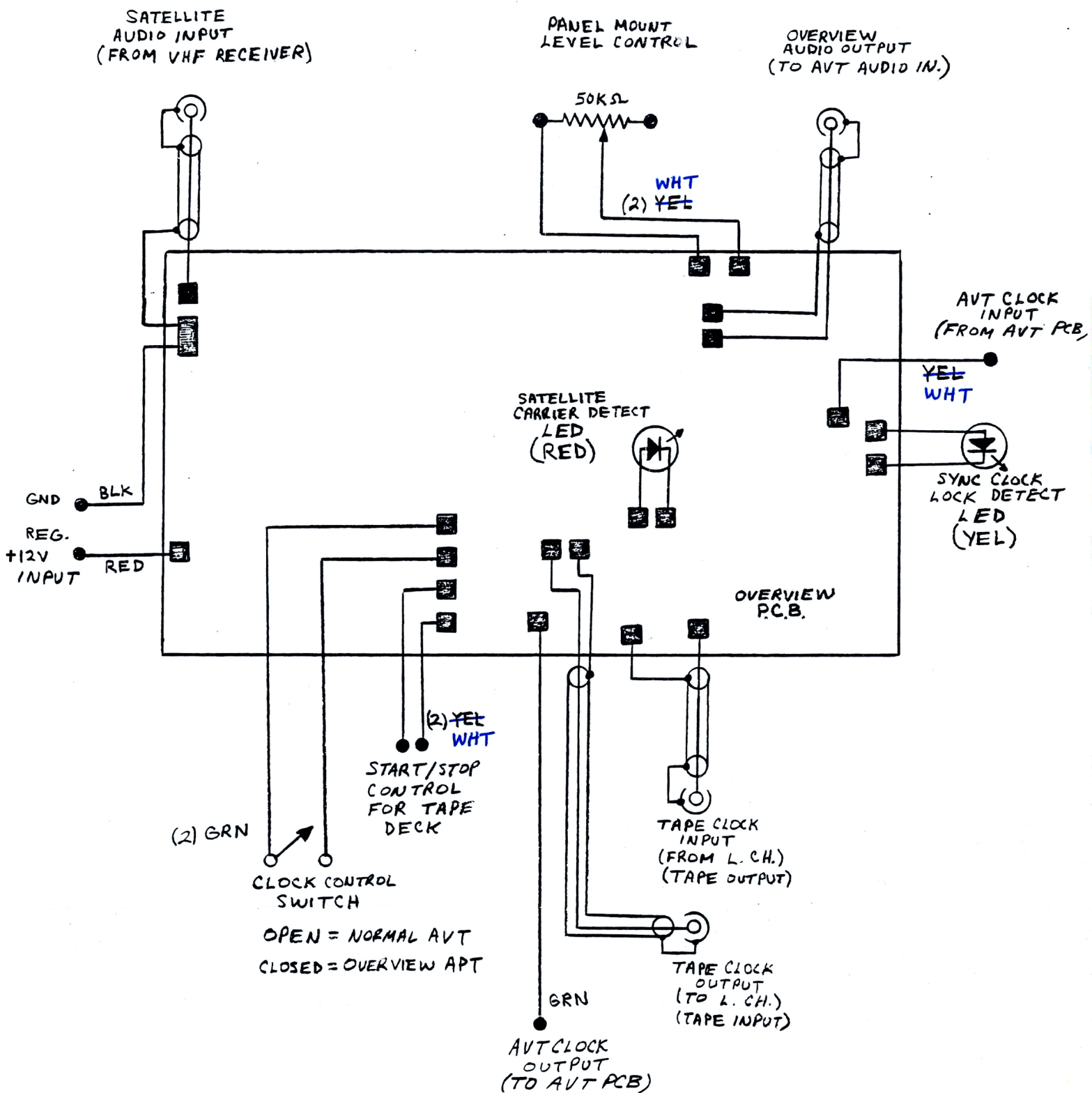
RECOMMENDED SATELLITE RECEIVERS

VANGUARD LABS - FM RECEIVER MODEL FMR-260-PL/REV2

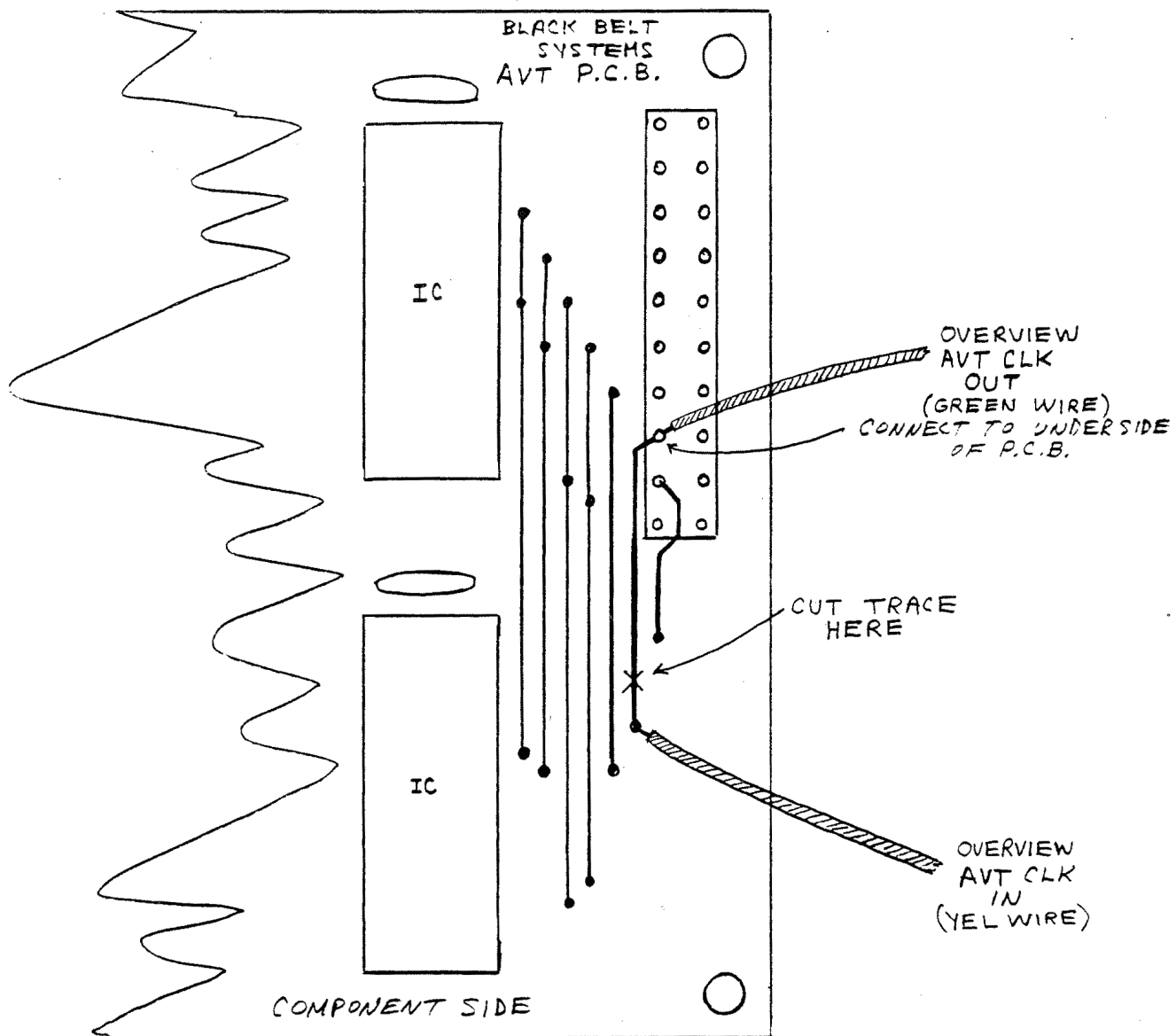
VANGUARD LABS
196-23 Jamaica Ave
Hollis, NY 11423
(718) 468-2720

HAMTRONICS - FM RECEIVER MODEL R137

HAMTRONICS, INC.
65-J Moul Road
Hilton, NY 14468-9430
(716) 392-9430



OVERVIEW P.C.B. CONNECTIONS
3-14-89 Tim Heffield



CONNECTIONS & MODIFICATIONS
TO AVT P.C.B. FOR OVERVIEW
T. HEFFIELD 3-89

