8. OPERATIONAL DESCRIPTION - MODEL Axcera-836A

8.1 General Description

The 836A is a complete 2000-watt UHF solid-state, internally diplexed television translator. It operates at a nominal visual output power of 2000 watts peak sync and an average aural output power of 200 watts, at an A/V ratio of 10 dB, 10% sound.

8.2 Technical Specifications

Type of Emissions:
- Visual 5M75C3F
- Aural 250KF3E

Frequency Range..... 470 MHz to 860 MHz (any 6-MHz channel)

Output Power
- Visual ..... 2000 watts peak sync
- Aural ..... 200 watts average

Maximum Power Rating
- Visual ..... 2000 watts peak visual
- Aural ..... 200 watts average aural

Power Consumption ..... 7000 watts

8.3 Performance Specifications

Visual Performance

Operating Frequency Range ..... 470 MHz to 860 MHz

RF output - Nominal:
- Power ..... 2000 watts peak sync
- Impedance ..... 50 ohms
- Connector ..... 7/8" EIA

Visual Sideband Response:
- -1.25 MHz and below ..... -20B
- -0.75 to -0.5 MHz..... +0.5, -2.0dB
- -0.5 MHz to +3.58 MHz..... ±0.5 dB
- 3.58 MHz to 4.18 MHz..... +0.5, -1.0 dB

Variation of Frequency Response with Brightness..... ±0.5 dB
Differential Phase ..... ±3°
Incidental Phase Modulation..... ±3°
Differential Gain 5%
Low Frequency Linearity 5%
Intermodulation Products ..... -52 dB (red field)
Output Variation (Over 1 Frame) 2%
Regulation of Output..... 3%

Signal-to-Noise Ratio ..... 55 dB

2t K-Factor 2%
Harmonic Radiation ..... -60 dB
Spurious (>3 MHz from channel edge) ..... -60 dB
Carrier Frequency Stability ..... ±1 kHz
Noise Figure w/Input Preamp ..... 3 dB (Max.)
Input Dynamic Range (no Preamp) ..... -60 to -15 dBm

Aural Performance

RF Output – Nominal
Power ..... 200 watts
Impedance ..... 50 ohms
Connector ..... 7/8" EIA

Electrical Requirements

Power Line Voltage ..... 230 volts, 50/60 Hz
Power Consumption ..... 7000 watts

Environmental

Maximum Altitude ..... 8,500 feet
Operational Temperature Range ..... -30°C to +50°C

Mechanical

Dimensions:
Width ..... 22 inches
Depth ..... 34 inches
Height ..... 76 inches
Weight ..... 750 lbs

8.4. System Overview

The 836A (1276-1000) is made up of the (2) trays listed in Table 8-1.

Table 8-1. 836A Major Trays and Assemblies

MAJOR ASSEMBLY DESIGNATOR	TRAY/ASSEMBLY NAME	DRAWING NUMBER
A3	VHF/UHF Receiver Tray	1265-1100
A4	UHF Exciter	1265-1300
A6, A7, A8, A9	Amplifier Tray	1281-1100

8.4.1 Receiver Tray

The RF Input to the Tray, (-61 dBm to -26 dBm in Level), is fed through J1 to the input 50Ω Filter or through J5 to the 75Ω input Filter, which are of a double tuned design that is adjusted to the desired Input UHF or VHF Channel Frequency. Note: If the input signal is greater then -25dBm, an attenuator should be used to limit the level to -25dBm. +12 VDC, for use by an (Optional) external Preamplifier Assembly, connects to the filter through F1 a 1 Amp Fuse. This +12 VDC is DC Multiplexed onto

the input signal cable from the Preamplifier. DS1 a Red LED located on TB1 in the Tray will be lit if the +12 VDC is present on the input cable. If a Preamplifier is not used, F1 should be removed and DS1 should not be lit.

The signal is next amplified +12 dB to approximately the -49 to -4 dBm level by a low noise amplifier located on the Dual Stage Amplifier Board that is contained in (A8) the Dual Stage Amplifier Assembly. The board has approximately +13 dB or +26 dB of gain, depending on whether Jumper W1 on J5 is in place. The signal is then filtered in (A9) a Channel Filter and then applied back to (A8-A1) the Dual Stage Board where the same amplification takes place. Jumper W1 on J7, located on the Dual Stage Board, should be removed if the Receiver Input level is greater than -40dBm. The output is connected to (A10) the Downconverter Amplifier Assembly that contains (A10-A1) the Downconverter Amplifier Board The RF, at the -47 dBm to -2 dBm Level, connects to the "R" Input Jack of the Mixer Z1 located on the Downconverter Amplifier Board.

The Local Oscillator Signal is derived from a cut to channel crystal mounted in an oven that is factory set at 45° C. The Oscillator operates at 1/8 for UHF, 1/4 for VHF High Band or 1/2 for VHF Low Band of the desired local oscillator frequency. The crystal is mounted on (A4-A1) the Channel Oscillator Board, Dual Oven that is part of the Channel Oscillator Assembly. The oscillator circuitry is a modified Colpitts design operating in a separate oven set at 50° C. for improved stability.

The output of the Channel Oscillator is connected to the (A5-A1) the x8 Multiplier Board for UHF, the x4 Multiplier Board for VHF HB or the x2 Multiplier Board for VHF LB, which is located in (A5) the Multiplier Enclosure. The proper multiplier board takes the output of the Channel Oscillator (+3 dBm) and multiplies it eight, four or two times by a series of three, two or one x2 Broadband Doublers (2x2x2 = x8), which produces the L.O. signal on the desired frequency needed for the upconversion process. The signal is then amplified to the +16 dBm level. A sample of the multiplied L.O. Signal is fed to a detector circuit which lights the Green LED DS1 that indicates that the L.O. is present at the Output Jack J2 of the Multiplier Board. This Green LED is seen through a hole the lid of the Multiplier Assembly and is an indication, when lit, that there is a signal present at the output of the Multiplier Board. The L.O. signal is filtered in (A6) a L.O. Filter and then sent (+15 dBm) to J2 on (A10-A1) the Downconverter Amplifier Board. The L.O. Input to the Downconverter Amplifier Board is connected thru a 3 dB matching pad to the "L" Input of the Mixer (Z1) at a +12 dBm level.

The L.O. and the RF signals are mixed in the Mixer Stage of the Downconverter Amplifier Board to produce the desired IF difference frequency at -55 dBm to -10 dBm in level, depending on the RF Input Level. The Combined IF Signal is routed to (A11-A1) the IF Filter/ALC Board which is mounted in (A11) the IF Filter/ALC Enclosure . The IF Filter/ALC Board contains a Pin Diode Attenuator circuit which is part of the Automatic Level Control (ALC) that controls the level of the IF Signal to the two stage amplifier ICs U1 and U2.

The (Optional) (A11-A2) SAW Filter/Amplifier Board is also contained in the IF Filter/ALC Enclosure. The SAW Filter/Amplifier Board connects to J5 and J6 of the IF Filter/ALC Board if more attenuation of the Out Of Band products is needed. If the SAW Filter/Amplifier Board is not needed, a jumper connects the Combined IF from J5 to J6 on the IF Filter/ALC Board.

The Combined IF is then bandpass filtered to the needed 6 MHz IF bandwidth around the 41.25 MHz + 45.75 MHz Combined IF signal and amplified by U3 to the -41 dBm to +4 dBm Level before it is split. One output is detected by U4 for use as the ALC reference level to the Pin Diode Attenuator Circuit. The ALC comparator drives the Pin Diode Attenuator Circuit to maintain the desired output level, typically +2 dBm. The other split output connects to J2 the Combined IF Output of the board that is cabled to the IF Output Jack of the Tray at J4 (+2 dBm).

The AC input to the Tray is 117 VAC or 230 VAC and is directed thru Jack J2, of the (A1) Power Entry Module to the step down Toroid (A2). The Power Entry Module contains an On/Off Switch, a 4 Amp Slo-Blo Fuse and three MOVs which protect the Tray from transients or surges which may occur on the AC Input Lines. When the On/Off Switch is switched On, AC is applied to the (A2) Toroid. The Toroid steps down the voltage into two 16 VAC outputs which are fed to (A3) the +12V(3A)/-12V Power Supply Board The 16 VAC Inputs are connected to the two full wave bridge networks one for +12 VDC and one for -12 VDC. The output of the +12 VDC rectifier is fed to three 7812 IC regulators (U1, U2 and U3) and the output of the -12 VDC rectifier is fed to one 7912 IC regulator (U4). The ±12V Power Supply Board provides the voltage regulated and current limited +12 VDC and -12 VDC to the rest of the boards in the Tray.

8.4.2 UHF Exciter Tray

The standard UHF Exciter Tray uses the Baseband Audio and Video Inputs, which are connected to the rear of the Tray and produces a diplexed RF Output. The UHF Exciter Tray is capable of operation, if the (Optional) 4.5 MHz Composite Input Kit is purchased, using either a 4.5 MHz Composite Input or Baseband Audio and Video Inputs to produce the diplexed RF Output.

The UHF Exciter Tray used in a Translator System with a Receiver Tray does not contain (A5) a Sync Tip Clamp/Modulator Board, (A4) an Aural IF Synthesizer Board or (A6) a Delay Equalizer Board. The Combined IF Output of the Receiver Tray connects to J6 on the UHF Exciter which is cabled to the ALC Board. The description of the UHF Exciter in a Translator System starts with the ALC Board. A Modulator Select must not be present at J11-10 to 28 on the rear of the Tray for the output of the Receiver Tray to be connected through the energized Relays to the rest to the UHF Exciter Tray.

Combined Aural IF + Visual IF Path

The Combined IF Output of the (Optional) Receiver Tray is the input connected to Jack J1 on the ALC Board. The Relays K3 and K4 provide the ability to switch the input of the ALC Board from the IF connected to J1 generated by an (Optional) external Receiver Tray and the internally generated IF connected to J32. The Modulator Select command provides the control of the Relays. The Modulator Select present at J11-10 & 28 located on the rear of the UHF Exciter Tray, de-energizes the Relays and connects the internally generated IF output to the rest of the ALC Board. The Modulator Select removed from J11-10 & 28, energizes the Relays and connects the IF from the Receiver Tray to the rest of the ALC Board.

The ALC Board provides the adjustment of the selected IF level by the input PIN attenuators which are set by the ALC circuitry. The (A20) Power Adjust Pot (R1) located on the Front Panel of the UHF Exciter Tray adjusts this level. The level can also be controlled by the Switch S1 located on the ALC Board, or remotely with a pull

down connected to J16 - 1 & 4 or 6 & 4, if the Remote Power Raise/Lower Option is present.

The ALC adjusted IF is applied to three linearity correctors, also located on the ALC Board. These correctors compensate for the nonlinearities of the final amplifier stages. The correction is achieved by producing the opposite amplitude transfer function, whose shape is set with the potentiometers on the board. The predistorted video leaves the ALC Board at J3 and goes to (A9) the IF Phase Corrector Board, which provides correction for intermodulation products and differential phase distortion generated in the output amplifiers.

The output of the IF Phase Corrector Board is fed back to the ALC Board at J7, where it is connected through an LC network that is adjusted by C63 which sets the frequency response for the IF. The IF is split with one path connected to the ALC circuit. The main path is connected to R99 the Output Level adjust to Jacks J27 and J28. The Jumpers W9 and W10 are moveable to include a 6 dB pad in the circuit if needed. The IF is connected through a Frequency Response circuit set by R103, R106, C71 and C72 to the amplifiers U13 and U14 then to the output of the board at J12. A Sample of the IF is supplied to J11 on the Board.

The IF from the ALC Board is connected to the IF Input Jack (J1) of (A11) the UHF Upconverter Board. The Board produces an On Channel RF Output Signal at J3 by mixing in Z1 the Combined IF Signal which is connected to J1 with the Local Oscillator Signal that is connected to J2. The RF signal exits the board at J3 and is filtered by (A12) a UHF Filter. It returns to the UHF Upconverter Board at J4 where it is applied to a pin diode attenuator network whose resistance, gain, is adjusted by R10 the manual gain adjust which sets the RF Output Level of the Tray. The jumper W1 on J10 is in the Manual position during normal operation. The RF is amplified by U2, Q1, Q2 and Q3 before it is sent to the RF Output Jack (J5) of the UHF Upconverter Board. The RF connects to (J15), the RF Output Jack, located on the rear of the Tray. A Sample of the RF is supplied to J6 on the Board. Another RF sample is peak detected and fed through R29, the Meter Calibration pot, to the Meter Output Jack at J7-1 which connects to the Transmitter Control Board.

L.O. Signal Path

The L.O. signal is generated on (A14-A1) the Channel Oscillator Board mounted in (A14) a Channel Oscillator Assembly. The L.O. is produced by a cut to channel crystal, located in an oven set at 50° C, which operates at 1/8 the required L.O. Frequency. If the (Optional) FSK Identifier Kit is purchased, the L.O. signal is generated on (A14-A1) a VCXO Channel Oscillator Board mounted in (A14) a VCXO Channel Oscillator Assembly. The frequency of the VCXO Board is controlled by the EEPROM FSK Identifier Board which Frequency Modulates the Identification Signal in Morse Code, for station identification, onto the L.O. Signal. The crystal is mounted in a Butler Common Base Oscillator Circuit, which is part of the Channel Oscillator Assembly, that has an oven set at 45° C for improved temperature stability. The CW signal from the oscillator is multiplied 8 times by (A15-A1) the x8 Multiplier Board, which is mounted in (A15) a x8 Multiplier Enclosure. The x8 Multiplier is actually three x2 frequency doublers (2x2x2=8). The multiplied oscillator signal, now at the L.O. Frequency, is filtered by (A16) a UHF Filter and connected to J2 on (A11) the UHF Upconverter Board where it is mixed with the IF Signal.

Metering and Control Functions

The (A19) Visual/Aural Metering Board, detects a Forward Sample of the Output Power Level as well as a Sample of the Reflected Power of the Transmitter from (A11) the Coupler Assembly. The Visual/Aural Metering Board generates an indication of the % Visual Output Power Level, the % Aural Output Power Level and the % Reflected Output Level of the Transmitter which connect to (A17) the Transmitter Control Board.

The % Power Levels are displayed on the Front Panel Meter using the Metering Switch S3 to select which is viewed. The levels are also available for remote monitoring through the Remote Jacks J10 and J11 located on rear panel of the Tray. The Transmitter Control Board provides the system control logic for the Transmitter and the adjustments for calibration of the Meter in the Video position using (R20) and Audio position using (R19) in the standard Exciter but in a Translator System the Video and Audio positions are not available. Calibration of the Meter in the ALC position uses (R15). The % Output Power Level of the Exciter also connects to the Front Panel Meter with R29 located on the UHF Upconverter Board used to calibrate the Meter.

The Control and the Status Indications of the Transmitter/Translator are provided by the Meter and the LED indicators located on the front panel of the UHF Exciter. The switches and LED indicators are part of the Transmitter Control Board which is mounted so that the switches and the LEDs are operated or viewed from the front Panel of the UHF Exciter. Switch (S1) is an Operate/Standby Switch that controls the output of the Transmitter/Translator by providing the Enables, when in Operate, needed to turn on the two UHF Amplifier Trays.

In Operate the Green LED (DS2) is On and when in Standby the Amber LED (DS1) is On. Switch (S2) is an Automatic/Manual Switch that controls the operation of the Transmitter by the presence of the Video Input Signal. When the switch is in Automatic, the Green LED (DS3) is lit and if the Video Input Signal is lost, the Transmitter will automatically switch to Standby after a few second delay. When the Video Input Signal returns, the Transmitter will automatically switch back to Operate.

In Manual, the Amber LED (DS4) is lit and the Operation of the Transmitter/Translator is controlled by the front panel switches. During Normal operation of the Transmitter/Translator, Switch S2 should be in the Auto position. The front panel of the UHF Exciter also has LEDs that indicate Video Fault (Loss), Red LED (DS9) and VSWR Cutback, Amber LED (DS7).

±12 VDC Power Supplies

The UHF Exciter Tray contains a ±12V power supply. The power supply is comprised of (A1) the Power Entry Module Assembly, (A2) a step down Toroid and (A3) a ±12V Power Supply Board. The ±12V Power Supply Board has a full wave bridge rectifier (CR9-CR12) for the -12 VDC and two full wave bridges (CR1-CR4 and CR5-CR8) for the +12 VDC. The ±12 VDC Power Supply Board has five one amp regulator ICs, four (U1-U4) for the +12 VDC and one (U5) for the -12 VDC. The Green LEDs DS1-DS4 are associated with the +12 VDC outputs at J3-J6 and are lit if the +12 VDC is present to that Jack. The Green LED DS5 is associated with the -12 VDC outputs at J7 and J8 and are lit if the -12 VDC is present to the Jacks. The +12 VDC and -12 VDC are connected to the rest of the Boards in the Tray. The +12 VDC is also connected from J11 of the UHF Exciter to each of the UHF Amplifier Trays for use by the LED Status

Indicators. The +12 VDC is applied to the UHF Amplifier Trays when the AC Circuit Breaker is switched On for the UHF Exciter Tray.

Faults

If the Reflected Power input increases above the level as set by R22, the VSWR Cutback adjust, the Amber LED DS7 lights and the board cuts back the Power level using the ALC levels. The Overtemperature Fault and the Video Fault are not used in this configuration.

Operation of the Tray

When the Exciter Circuit Breaker located on the AC Distribution Panel is switched On, the 220 VAC Input is applied to J14 of (A1) the Power Entry Module. The Power Entry Module contains an On/Off Switch and a 4 Amp Fuse for AC protection. The Input AC is fed to (A2) a Toroid which steps down the AC to two 16 VAC outputs that are connected to the three full wave bridge rectifiers located on (A3) the ±12V Power Supply Board. The ±12 VDC Power Supply Board provides regulation and current limiting of the ±12 VDC Outputs which are then distributed to the rest of the Boards in the Tray, the +12 VDC through Jacks (J3-J6) and -12 VDC through Jacks (J7 & J8). The -12 VDC at J8 Pins 6 & 2 connects to A10 a 12 VDC Fan, located on the rear panel, that will operate. The +12 VDC is connected from J11 of the UHF Exciter to each of the UHF Amplifier Trays for use by the LED Status Indicators.

When the Operate/Standby switch, located on the front panel, is switched to Operate, the latching relay K1 located on the Transmitter Control Board supplies the Enables which are applied to the UHF Amplifier Trays and lights the Green Enable LED. For the Tray to operate, an Interlock Low must be connected to the Transmitter Control Board and if the interlock present the Green Interlock LED DS5 is lit.

8.4.3 UHF Amplifier Tray

The UHF Amplifier Tray provides, with a RF Input of +6 dBm Visual & -4 dBm Aural, an output of +58 dBm Visual & +48 dBm Aural. The Tray becomes a 1294-1112 with a Low Band Kit, a 1294-1113 with a Mid Band Kit and 1294-1114 with a High Band Kit.

Tray Description

The Input to the UHF Amplifier Tray at the BNC type connector Jack J1 is the Diplexed On Channel Visual + Aural Signal (+6 dBm Visual & -4 dBm Aural from the Splitter Assembly. The input RF is connected to (A2-A1) the Variable Gain/Phase Board which is mounted in (A2) the Variable Gain/Phase Enclosure. The Variable Gain/Phase Board contains a voltage variable pin diode attenuator that maintains a constant gain through the Tray by means of an (AGC) automatic gain control circuit. The gain of the Tray is adjusted by the Front Panel mounted 5kΩ Gain Control Pot R6 through the Amplifier Control Board which applies the Gain Bias to the pin diode attenuator circuit located on the Variable Gain/Phase Board. The phase shift through the Tray is adjusted by the Front Panel mounted 5k□ Phase Control Pot R5 through the Amplifier Control Board that applies the Phase Bias to the Phasing Circuit L1 located on the Variable Gain/Phase Board. The Phase of the Tray needs to be adjusted to give maximum output power when the outputs of the multiple UHF Amplifier Trays are combined. The Phase and Gain adjusted signal is amplified by (A3-A1) the 1 Watt UHF Amplifier Board mounted in (A3) a 1 Watt UHF Amplifier Assembly. This board uses a

single stage UTV040F transistor which is biased Class A and has a gain of approximately 9 dB. The RF is connected through (A1) a UHF Filter, which is tuned to remove any unwanted out-of-band products, to the Input Jack J1 of (A4) an Amplifier Enclosure which contains (A4-A1) a Single Stage Amplifier Assembly, Class A, (A4-A2) a Coupler Board Assembly and (A4-A3) a Dual Stage Amplifier Assembly, Class AB.

The filtered RF signal from J1 on (A4) enters (A4-A1) the Single Stage Amplifier Assembly, Class, that is made using the Generic Single Stage Amplifier Board, Class A and the needed Frequency Determining Kit. The board uses a PTB20101 Transistor biased Class A to produce a gain of 11 dB. The board contains the biasing circuit that provides constant current biasing for the transistor. The Board mounted Green LED DS1 will be lit if the Transistor Q1 is operating normally. The Bias Adjust R6 sets the operating current for Q1.

The signal is then applied through (A4-A2) the Coupler Board Assembly, which supplies a sample of the RF Level, to the Amplifier Control Board. The sample is fed to the overdrive protection circuit located on the Amplifier Control Board and if the level through the Coupler Board Assembly increases above the threshold set by the Overdrive Threshold adjustment, the Amplifier Control Board will decrease the drive to the gain stages by decreasing the output level of the Variable Gain/Phase Board using the AGC Bias voltage. The RF signal output of the Coupler Board Assembly is amplified by (A4-A3) a Dual Stage Amplifier Assembly, Class AB, which uses the Generic Dual Stage Amplifier Board, Class AB and the needed Frequency Determining Kit. This board uses two PTB20101 Transistors in parallel biased Class AB to amplify the signal to approximately +49 dBm. The Bias Adjust R106 sets the operating current for Q101 and the Bias Adjust R206 sets the operating current for Q201.

The output of the Dual Stage Amplifier Board is connected to (A5) the Final Amplifier Enclosure which contains (A5-A1) a 4 Way Splitter Assembly, (A5-A2, A5-A3, A5-A4 & A5-A5) four Dual Stage Amplifier Assemblies, Class AB and (A5-A6) a 4 Way Combiner Assembly. The 4 Way Combiner Assembly contains (A5-A6-A1) a 4 Way Combiner Board, (A5-A6-A2) a Circulator and two Thermal Switches (A5-A6-A3 & A5-A6-A4) mounted on the Combiner Assembly for Overtemperature protection.

The input to the (A5) Amplifier Enclosure (+49 dBm) is split four ways by (A5-A1) the 4 Way Splitter Assembly. Each output of the splitter drives one of four output amplifiers (A5-A2, A5-A3, A5-A4 & A5-A5) which are Dual Stage Amplifier Assemblies, Class AB, that uses a Generic Dual Stage Amplifier Board, Class AB and the needed Frequency Determining Kit.

Each of the Dual Stage Amplifier Boards uses two PTB20101 Transistors in parallel biased Class AB to amplify the signal. The Bias adjust R106 sets the operating current for Q101 and the Bias adjust R206 sets the operating current for Q201. The outputs of each of the Dual Stage Amplifier Boards are approximately +52 dBm, which are fed to (A5-A6) a 4 Way Wilkinson Combiner Board Assembly. The signals are Combined to produce a typical final output of +58 dBm Visual & +48 dBm Aural, 600 Watts & 60 Watts. This output goes through (A5-A6-A2) a Circulator, which protects the Tray from high reflected power, to the output of the Tray at the "N" type connector Jack J2.

The (A8) Amplifier Control Board, provides an Automatic Gain Control circuit (AGC) to the Tray, output level sample inputs to (A9) the Meter and protection of the Tray against overdrive, overheating and high VSWR conditions. The 4 Way Combiner Board (A5-A6-A1) supplies a Forward and a Reflected Output Power Sample to (A6-A1) the

Dual Peak Detector Board, which is mounted in (A6) a Dual Peak Detector Enclosure. The Dual Peak Detector Board takes the Forward and the Reflected Output Power Samples and provides peak detected DC levels to the Amplifier Control Board which uses them for metering and Tray protection purposes. The Amplifier Control Board regulates the gain of the Tray by adjusting the AGC Bias applied to the pin diode attenuators located on (A2-A1) the Variable Gain/Phase Board. If there is an overdrive or high reflected power condition, the Amplifier Control Board lowers the AGC Bias applied to the pin diode attenuators, which reduces the output power of the Tray. If an Overtemperature Fault occurs because one of the Thermal Switches (A5-A6-A3 or A5-A6-A4) closes, due to overheating of the output amplifier heatsink, the +5 VDC Enable to the Switching Power Supply will be removed which Disables the Switching Power Supply eliminating any RF Output Power until the temperature of the heatsink returns to normal. The Amplifier Control Board has adjustments for setting the Cutback Thresholds and Magnitudes and also for calibration of the Front Panel Meter in the Power Supply Position.

Operation of the Tray

The 220 VAC Input needed to operate the Tray connects to the Tray at J4 when the Amplifier Circuit Breaker, located on the AC Distribution Panel, is switched ON. The Input AC connects to (A12) a +26.5V/2000W Switching Power Supply that supplies the +26.5 VDC to the three cooling Fans and through the Amplifier Protection Board to the rest of the boards in the Tray when the Tray is Enabled. The Enable is applied to the Tray at J3-9 from the UHF Exciter Tray when the Transmitter is switched to Operate. The outputs of the Switching Power Supply are connected to (A7) the Amplifier Protection Board and also to (A13, A14 & A15) which are three Fans used for cooling the Tray. The Amplifier Protection Board provides 7 Amp fused protection of the +26.5 VDC outputs before they are distributed to the Amplifier Boards in the Tray. An external +12 VDC needed for operation of the Status LEDs mounted on the Amplifier Control Board is applied to the UHF Amplifier Tray through J3-7 from the UHF Exciter Tray. The +12 VDC is present when the Main AC is applied to the UHF Exciter Tray.

8.5 Control and Status

8.5.1 Receiver Tray

There are no external Control and Status indicators or switches for the Receiver Tray.

Table 8-2. Receiver Tray samples

CONNECTOR	FUNCTION
J6 - BNC	Oscillator Sample (front panel)
J7 - BNC	IF Sample (front panel)

8.5.2 UHF Exciter Tray

Table 8-3. UHF Exciter Tray samples

CONNECTOR	FUNCTION
J19 - BNC	RF Output Sample (front panel)
J17 - BNC	Oscillator Sample (front panel)

Table 8-4. UHF Exciter Tray Switches

SWITCH	FUNCTION
Translator S1 Operate/Standby	The momentary switch S1 applies a ground to K1, a latching relay on the transmitter control board. K1 will switch either to Operate or to Standby depending on which direction S1 is pushed. When switched to Operate, the low Enable Commands, are applied to the four UHF Amplifier Trays. These Enables will turn on the UHF Amplifier Trays. The opposite occurs when switched to Standby.
Mode Select S2 Auto/Manual	The momentary switch S3 applies a ground to K2, a latching relay on the transmitter control board. K2 will switch the translator to Automatic or Manual depending on which direction S3 is pushed. In Automatic, the input fault command from the ALC board will control the operation of the translator. The translator will switch to Standby, after a slight delay, if the input signal is lost and will switch back to Operate, quickly, when the signal is restored. In Manual, the translator is controlled by the operator using the front panel Operate/Standby switch or by remote control.
Power Adjust (R1)	The 5-kΩ pot sets the ALC level on the ALC board that sets the output power of the translator.

SWITCH	FUNCTION
S3 - % Aural Power	Reads the % Forward Aural Output Power of the UHF Exciter tray.
S3 - % Reflected Power	Reads the % of Reflected Visual Power of the UHF Exciter tray
S3 - % Visual Power	Reads the % Forward Visual Output Power of the UHF Exciter tray.
S3 - % Exciter	Reads the % Exciter Output Power Level needed to obtain 100% Output of the translator.
S3 - ALC	Reads the ALC voltage level.

Table 8-5. UHF Exciter Tray Indicators

INDICATOR	DESCRIPTION
Input Loss (Red)	Indicates that the input signal to the translator has been lost. The fault is generated on the ALC board in the UHF Exciter tray.
VSWR Cutback (Amber)	Indicates that the reflected power level of the translator has increased above 20%; this automatically cuts back the output power level to 20%. The fault is generated on the transmitter control board in the UHF Exciter tray.
Operate (Green)	Indicates that the translator is in the Operate mode.
Standby (Amber)	Indicates that the translator is in the Standby mode.
Auto (Amber)	Indicates that the translator is in the Auto mode.
Manual (Green)	Indicates that the translator is in the Manual mode.

8.5.3 UHF Amplifier Tray

Table 8-6. UHF Amplifier Tray samples

CONNECTOR	FUNCTION
J5 - BNC	Module O/P Sample (front panel)

Table 8-7. UHF Amplifier Tray Switches

SWITCH	FUNCTION
S2 - % Output Power	Reads the % Output Power of the UHF Amplifier tray, 100% = 600 watts Peak of Sync Visual + Aural.
S2 - % Reflected Power	Reads the % of Reflected Output Power of the UHF Amplifier tray, <20% with all Amplifier trays operating.
S2 - Power Supply	Reads the Power Supply Voltage, +26.5 VDC of the UHF Amplifier tray.
A10-R6 Control	Adjusts the gain of the RF output when the Amplifier Control Board is in the AGC mode.
A10-R5 Control	Adjusts the phase of the RF output, approximately 70 degrees.

Table 8-8. UHF Amplifier Tray Indicators

INDICATOR	DESCRIPTION
Enable (Green)	Indicates that Enable, Operate Command, is applied to the UHF Amplifier Tray from the UHF Exciter Tray.
Overdrive (Red)	Indicates that the level of drive is too high. The protection circuit will limit the drive to the set threshold. The fault is generated on the Amplifier Control Board.
VSWR Cutback (Red)	Indicates that the reflected power level of the tray has increased above 50%; this automatically cuts back the output power level to 20%. The fault is generated on the Amplifier Control Board.
Overtemp (Red)	Indicates that the temperature of (A5-A6-A3) & A5-A6-A4) one or both of the thermal switches mounted on the heatsink assembly for the output amplifiers is above 173 degrees F. When this fault occurs, the Enable to the switching power supply in the affected Amplifier tray is removed immediately and it will shut down.
Input Fault (Red)	Indicates that the input RF Level to the Amplifier Trays dropped below the 0 dBm range.

8.6 Remote Interface Connections, Translator

The Remote Connections, as listed below, are made if the Optional (A17) A/V Input & Remote Interface Assembly (1276-1008) **is not present** in your System. Refer to the Interconnect Drawing (1276-8000) for the proper Pin Remote Connections.

Function Type	**Connector**	**Interface**
UHF Exciter		
Translator Enable Interlock	J11-24	J11-24 & 23 must be Jumpered together for Normal Operation. (1176-1038) Jumper Jack is used.
Translator Enable Interlock Rtn.	J11-23	
Remote Control Commands:		
Translator Standby (Disable)	J11-22	Contact Closure
Translator Standby/Operate Rtn.	J11-21	
Translator Operate (Enable)	J11-20	Contact Closure
Translator Manual	J11-9	Contact Closure
Translator Auto/Manual Rtn.	J11-36	
Translator Auto	J11-8	Contact Closure
Power Level Raise (Optional)	J10-11	Contact Closure
Pwr Lvl Raise/Lower Rtn (Optional)	J10-13	
Power Level Lower (Optional)	J10-12	Contact Closure
Modulator Select (Optional)	J11-10	Contact Closure
Modulator Select Rtn (Optional)	J11-28	
Remote Status Indications:		
Translator Operate (Enable) Ind.	J10-3	50mA Max. Current Sink
Operate/Standby Ind. Return	J10-16	
Translator Standby (Disable) Ind.	J10-4	50mA Max. Current Sink
Translator Auto Indicator	J11-7	50mA Max. Current Sink
Auto/Manual Indicator Return	J11-32	
Translator Manual Indicator	J11-6	50mA Max. Current Sink
VSWR Cutback Indicator	J11-37	50mA Max. Current Sink
VSWR Cutback Indicator Return	J11-35	
Video Loss (Fault) Indicator	J11-25	50mA Max. Current Sink
Video Loss (Fault) Ind. Rtn.	J11-31	
Receiver Fault Indicator	J11-12	50mA Max. Current Sink
Visual Output Power	J11-26	1V full scale at 1kW source resistance
Visual Output Power Rtn	J11-29	
Aural Output Power	J11-27	1V full scale at 1kW source resistance
Aural Output Power Rtn	J11-30	

Remote Metering:

Reflected Power	J10-5	1V full scale at 1kW
Reflected Power Rtn	J10-17	source resistance
Exciter Output Power	J10-10	1V full scale at 1kW
Exciter Output Power Rtn	J10-22	source resistance

UHF Amplifier Trays

Remote Metering:

Forward Output Power (A6) UHF Amp	J3-3	1V full scale at 1kΩ
Forward Output Power (A6) Rtn	J3-4	source resistance
Reflected O/P Power (A6) UHF Amp	J3-5	1V full scale at 1kΩ
Reflected O/P Power (A6) Rtn	J3-6	source resistance
Forward Output Power (A7) UHF Amp	J3-3	1V full scale at 1kΩ
Forward Output Power (A7) Rtn	J3-4	source resistance
Reflected O/P Power (A7) UHF Amp	J3-5	1V full scale at 1kΩ
Reflected O/P Power (A7) Rtn	J3-6	source resistance
Forward Output Power (A8) UHF Amp	J3-3	1V full scale at 1kΩ
Forward Output Power (A8) Rtn	J3-4	source resistance
Reflected O/P Power (A8) UHF Amp	J3-5	1V full scale at 1kΩ
Reflected O/P Power (A8) Rtn	J3-6	source resistance
Forward Output Power (A9) UHF Amp	J3-3	1V full scale at 1kΩ
Forward Output Power (A9) Rtn	J3-4	source resistance
Reflected O/P Power (A9) UHF Amp	J3-5	1V full scale at 1kΩ
Reflected O/P Power (A9) Rtn	J3-6	source resistance

The above connections are made to Jack (J11), the 37 Position "D" Connector and to J10, the 25 Position "D" Connector, located on rear of the (A4) UHF Exciter or to Jack (J3), the 25 Position "D" Connector, located on the rear of the (A6, A7, A8 & A9) UHF Amplifier Trays. Refer to the Interconnect Drawing (1276-8000) for the proper Pin Remote Connections.

8.7 AC Input

8.7.1 Receiver Tray

The AC input to the Receiver Tray is 117 VAC or 230 VAC and is directed thru Jack J2, of the (A1) Power Entry Module (1265-1104), to the step down Toroid (A2). The Power Entry Module contains an On/Off Switch, a 4 Amp Slo-Blo Fuse and three MOVs, which protect the Tray from transients or surges, which may occur on the AC Input Lines.

8.7.2 UHF Exciter Tray

The AC input to the UHF Exciter Tray is 117 VAC or 230 VAC and selected by the Power Entry Module (A1). The AC input is applied to the tray through Jack J14.

8.7.3 UHF Amplifier Tray

The AC input to the UHF Amplifier Tray is 230 VAC. The AC input is applied to the tray through Jack J4. A MOV (VR1) is provided to protect the Tray from transients or surges, which may occur on the AC Input Lines.