

8. OPERATIONAL DESCRIPTION - MODEL ADC-840A

8.1 General Description

The 840A is a complete 10,000-watt UHF solid-state internally diplexed television transmitter. It operates at a nominal visual output power of 10,000 watts peak sync and an average aural output power of 1000 watts, at an A/V ratio of 10 dB, 10% sound.

8.2 Technical Specifications

Type of Emissions:

Visual..... 5M75C3F

Aural..... 250KF3E

Frequency Range470 MHz to 860 MHz (any 6-MHz channel)

Output Power

Visual..... 5000 to 10,000 watts peak sync (front panel adjustable)

Aural..... ≤1000 watts average

Maximum Power Rating

Visual..... 10,000 watts peak visual

Aural..... 1000 watts average aural

Power Consumption 22,000 watts

8.3 Performance Specifications

Visual Performance

Operating Frequency Range 470 MHz to 860 MHz

RF output - Nominal:

Power..... 10,000 watts peak sync

Impedance..... 50 ohms

Connector..... Type 1 5/8" EIA

Video Input:

Level..... 1 volt peak to peak

Impedance..... 75 ohms bridging

Visual Sideband Response:

From -0.5 MHz to +3.58 MHz..... ±0.5 dB

3.58 MHz to 4.18 MHz..... +.5, -1.0 dB

Below -1.25 MHz -20 dB

Above +4.75 MHz -30 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 Distortion -52 dB

Amplitude Variation Over One Field.....	2%
Regulation Of Output.....	3%
Envelope Delay vs. Frequency	Per FCC curves
2T Pulse.....	2%
12.5T Pulse	5%
Modulation Capability	1%
AM Noise	-55 dB
Harmonic Emission.....	-60 dB
Spurious Emission.....	-60 dB
Carrier Frequency Stability.....	±250 Hz

Aural Performance

RF Output – Nominal

Power.....	≤1000 watts
Impedance.....	50 ohms
Connector.....	Type 1-5/8" EIA

Aural Input:

Impedance.....	600 ohms
Level.....	+10 dBm

Amplitude vs. Frequency Response ..75 microseconds pre-emphasis ±0.5 dB

Audio Harmonic Distortion

Noise:

AM.....	-55 dB
FM	-60 dB

Aural to Visual Carrier Separation

Modulation Capability

Subcarrier Input

Electrical Requirements

Power Line Voltage.....	208 volts to 240 volts, 50/60 Hz
Power Consumption	22,000 watts, black picture

Environmental

Maximum Altitude.....	8,500 feet
Ambient Temperature.....	0°C to +40°C

8.4. System Overview

The 840A is made up of three cabinet assemblies: the (A1) dual 250-watt driver/amplifier assembly (1064946); (A2) the 10-kW amplifier assembly (1299-1100); and (A3) the high-voltage power supply assembly, 208/240 VAC (1068022).

8.4.1 (A1) Dual 250-Watt Exciter/Amplifier Assembly (1064946)

The dual 250-watt driver/amplifier assembly is made up of the assemblies and trays shown in Table 8-1.

Table 8-1. Driver/Amplifier Assembly Assemblies and Trays

DESIGNATION NUMBER	TRAY/ASSEMBLY NAME	DRAWING NUMBER
A2	AC distribution assembly	1265-1600
A4	UHF exciter tray	1063301
A9	3-watt amplifier tray	1068203
A6 and A7	250-watt amplifier trays	1044027, low-band; 1044028, mid-band; 1044029, high-band
A14	Bandpass filter assembly	--

The exciter/amplifier assembly (1064946) is connected to the baseband video and aural inputs. The assembly also provides connections for the remote monitoring and operation of the exciter/amplifier assembly. The UHF exciter tray (1063301) takes the baseband aural and video inputs and produces the visual and aural RF signals on the channel frequencies. The combined visual and aural RF output (+7 dBm) of the exciter feeds the 3-watt amplifier tray (1068203). The 3-watt amplifier tray contains an automatic gain control circuit and two 3-watt amplifier boards. The tray generates the output level needed to drive the 250-watt amplifier trays (1044027, low-band; 1044028, mid-band; and 1044029, high-band).

The output from the 3-watt tray is fed to the (A10) RF hybrid splitter SMA connection J1. The RF hybrid splitter output feeds the RF signal to one of the 250-watt amplifiers directly and, through (A5) the line stretcher, to the other 250-watt amplifier. The line stretcher gives the operator the ability to control the phase of the output signal that is fed to one of the 250-watt trays. Each of the 250-watt amplifier trays contains an amplifier enclosure and feedforward circuits to achieve an output of 250-watts peak visual power and 25 watts of aural power.

In the 250-watt amplifier tray, a forward power sample from the UHF coupler is connected to the dual peak detector board; this board provides a peak-detected forward sample to the amplifier control board for metering purposes. Before exiting the 250-watt amplifier tray, the RF is fed through a circulator for the protection of the tray from high VSWR conditions. The reject port of the circulator is cabled to the reject load/coupler board; this board supplies the reflected sample to the dual peak detector board, single supply. This signal is then sent to the amplifier control board for metering purposes. The output of the 250-watt visual amplifier trays is combined in a UHF tee combiner, and fed through (A14) a bandpass filter and (A11) a directional coupler, before being connected with 1/2" heliax to the RF input jack (A2-A1-J1) of the tube cavity assembly in the 10-kW amplifier assembly cabinet. The combined output of the 250-watt visual amplifier trays (350 watts) is the level needed to drive the 10-kW amplifier to 10,000 watts peak sync visual output.

The main AC input to the exciter/amplifier assembly is (A2) the AC distribution panel assembly (1265-1600). The AC distribution panel assembly contains a terminal block (TB1) that connects to the main AC input (208/240 VAC). The terminal block has four metal-oxide varistors (MOVs) connected across the input lines for surge and transient protection. The AC distribution panel contains CB1, the 40-amp main AC circuit breaker that distributes the AC through the circuit breakers CB2 to CB7 to the exciter and amplifier trays.

8.4.2 (A2) 10-kW Diacrode Amplifier (1299-1100)

The (A11) metering control panel (1293-1308) on the amplifier assembly provides the operator with front panel metering for all voltage (M1 using S1) and current (M2 using S3) readings that apply to the tube. The metering control panel also provides the aural, visual, and reflected output power readings for the transmitter using meter M3 with switch S4. The front panel assembly contains the switches that control the Operate/Standby (S5) and Automatic/Manual (S6) operation of the 10-kW amplifier. When switched to Operate, the panel supplies the driver enable (Operate command) to the exciter/amplifier assembly. The Automatic/Manual switch selects either the automatic operation of the transmitter, which uses the video input to control the on/off state of the transmitter, or the Normal front panel control, manual operation, of the transmitter. The metering control panel also provides front panel control, through switch S8, of the Visual Output Power level. High-Voltage Enable/Disable switch S7 controls the high-voltage power supply from the front panel of the 10-kW diacrode amplifier. Normal/Exciter Test switch S10, when in the Exciter Test position, gives the operator the ability to operate the exciter/amplifier assembly without operating the 10-kW amplifier.

Note: The exciter/amplifier assembly output must be terminated into a dummy load prior to using this function.

The metering control panel also has LEDs on the front panel for a visual indication of the operating status of the transmitter: Operate/Standby, Auto/Manual, High Voltage Enable/Disable, Driver Mode Normal/Test, 3-Fault with Fault Reset Switch (S9), Fault Status Overtemp, and VSWR Cutback. The front panel has command status LEDs that indicate, when they are lit, that the command has been given. In addition, the front panel has Operate status LEDs that indicate, when they are lit, that the command has been carried out.

The metering control panel of (A10) the remote control and cabinet interface assembly provides intercabinet control and monitoring for the exciter and high-voltage cabinets. The remote control and cabinet interface assembly also provides remote access to the transmitter for monitoring and control purposes.

The (A6) screen power supply assembly, 60 Hz (1293-1321), in the rear compartment of the amplifier cabinet, produces the 500 VDC at 60 mA for the tube. The (A5) control and bias power supply assembly (1181-1402) contains two separate power supplies: the control power supply and the bias power supply. The control power supply produces the ± 12 VDC to the metering circuits (peak detectors) in the 10-kW amplifier as well as the fault sensing boards, differential buffer boards, and control logic boards in the metering control panel. The bias power supply produces the -80 VDC bias voltage to the tube. R1, the bias voltage adjustment, is located behind the metering control panel. It sets up the idling current (1.5 amps), no RF drive, by adjusting the bias voltage. The (A3) filament power supply assembly (1299-1107) produces the 5.2 VDC to the filament of the tube. The 10-kW assembly also has (A16) a blower assembly (1293-1325) that provides the coolant air flow to the tube mounted in the cavity assembly.

The RF output of the 10-kW amplifier at (A2-A1-J2) is fed through a 3-1/8" hardline to (A2) an output coupler (1020-1043) that provides a reflected power sample for fault and VSWR cutback protection. The output at (A2-A2-J2) connects to two UHF trap filters. The trap filters screen out the -3.58-MHz, -4.5-MHz, +8.08-MHz, and +9.00-MHz intermodulation products as well as the second visual harmonic frequency. The output of the trap filter is fed through (A18) the output coupler (1020-1002) that provides a

reflected and forward power sample to (A19) the visual/aural metering assembly (1162-1402) for metering purposes. The output of the coupler is then fed to the antenna.

The visual/aural metering assembly consists of (A1) a single peak detector board (1162-1403) for the reflected output metering. It also contains (A2) a visual/aural metering board (1161-1103 or 1161-1115) for aural output and visual output power levels and reflected power level for VSWR protection.

8.4.3 (A3) High-Voltage Power Supply Assembly, 208/240 VAC (1068022)

The (A3) high-voltage power supply assembly, 208/240 VAC (1068022), provides the 10-kW amplifier, through TB4, with the AC voltage that the assembly needs to operate. It also supplies the AC needed to operate the blower assembly, through TB6, and the high-voltage, using 18 AWG 29-kV rubber insulated wires, needed to operate the tube in the 10-kW amplifier. The high-voltage power supply produces the 5000 VDC at 4.00 amps, maximum current (black picture), or 1.5 amps idling current (no RF drive applied) for the plate (anode) of the tube. The assembly contains (A1) the high-voltage transformer (1293-6103), (A5, A6, and A7) the three high-voltage rectifier boards (1293-1101), (A8, A19, A22, and A23) filter capacitors, and (A16) the choke that generate the high voltage. The high-voltage power supply assembly also contains the power supply metering boards, the isolation relay boards, the circuit breakers needed to supply high-voltage metering, high voltage-on sense, the power-on sequence, the switching on and off, and the protection of the high voltage. The high-voltage power supply, at TB2, is connected to the 10-kW assembly that provides the +12 VDC for metering, switching, and the Enable to the high-voltage power supply.

8.4.4 (A19) Visual/Aural Metering Assembly (1162-1402)

The visual/aural metering assembly takes the forward and reflected power samples from the (A2-A2) and the (A18) output couplers. The assembly provides the metering control panel on the front panel meters with visual, aural, and reflected levels for remote monitoring and VSWR protection.

The visual/aural metering assembly consists of (A1) a single peak detector board (1162-1403) for the reflected output metering. It also contains (A2) a visual/aural metering board (1161-1103 or 1161-1115) for aural output and visual output power levels and reflected power levels for VSWR protection.

8.5 Control and Status

Information on the control and status of this system is provided by control, status, and LED indicators and meters on the front panel of the trays. The functions of these control and status indicators are described in the following tables.

8.5.1 Exciter/Driver Cabinet

8.5.1.1 UHF Exciter Tray

Table 8-2. UHF Exciter Tray Meters

METER	FUNCTION	
Meter (A4-A18)	<p>Reads power in terms of a percentage of the calibrated output power level on the upper scale. The voltage level or frequency level is read on one of the two bottom scales. A full-scale reading on the top scale is 120%; 100% is equivalent to the full-rated 350 watts peak of sync visual. This meter also reads % Aural Power, % Exciter Power, audio levels, video levels, and ALC levels.</p>	
	<i>With Switch S3 in Position</i>	<i>Display</i>
	Switch (S3), Meter	Selects the desired ALC voltage reading, % Exciter Power, % Visual Power, % Aural Power, video levels, or audio levels.
	Audio	Reads the audio level, ± 25 kHz balanced or ± 75 kHz composite, on the 0 to 10 (0 to 100 kHz) scale. Indicates baseband audio if it is connected to the transmitter and even with the video + 4.5 MHz SCA input selected.
	ALC (0 to 10 V)	Reads the ALC voltage level, .85 VDC, on the 0 to 10 scale
	% Exciter (0 to 120)	Reads the % Exciter Output Power level needed to attain 100% output of the transmitter on the top scale
	% Aural Power (0 to 120)	Reads the % Aural Output Power of the exciter/driver assembly (100%=45 watts at 10 dB A/V ratio) on the top scale
	% Visual Power (0-120)	Reads the % Output Power of the exciter/driver assembly (100%=450 watts peak sync) on the top scale
	Video (0-1V)	Reads the video level, 1V at white, on the 0-10 scale

Table 8-3. UHF Exciter Tray Control Switches

SWITCH	FUNCTION
Transmitter (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. The opposite occurs when S1 is switched to Standby.
Mode Select (S2) Auto/Manual	The momentary switch (S2) applies a ground to K2, a latching relay on the transmitter control board. K2 will switch the transmitter to Automatic or Manual, depending on which direction S2 is pushed. In Automatic, the Video Fault command from the ALC board will control the operation of the transmitter. The transmitter will switch to Standby, after a slight delay, if the video input is lost and will switch back to Operate, quickly, when the video is restored. In Manual, the transmitter is controlled by the operator using the front panel Operate/Standby switch or by remote control.
Power Adjust (R1)	The 5 k Ω pot, A20, sets the ALC level on the ALC board. This sets the output power for the transmitter.

Table 8-4. UHF Exciter Tray Fault Indicators

FAULT INDICATOR	FUNCTION
Video Loss (DS9 Red)	Indicates that the video input to the transmitter has been lost. The fault is generated on the ALC board in the UHF exciter tray.
VSWR Cutback (DS7 Amber)	Indicates that the reflected power level of the 10-kW transmitter has increased above 15%. This will automatically cut back the output power level to 15%. The fault is generated on the transmitter control board in the UHF exciter tray and is derived from a peak-detected voltage in the amplifier cabinet.

Table 8-5. UHF Exciter Tray Samples

SAMPLE	DESCRIPTION
f(IF)	A sample of the visual IF that is taken from the sample jack on the IF carrier oven oscillator board
f(IC)	A sample of the intercarrier signal that is taken from the sample jack on the aural IF synthesizer board
f(s)	A sample of the channel oscillator output that is taken from the sample jack of the channel oscillator assembly
Exciter O/P	An output power sample of the exciter that is taken from the UHF upconverter board

8.5.2 3-Watt Amplifier Tray

Table 8-6. 3-Watt Amplifier Tray Meter

METER	FUNCTION	
Power Meter, Switch (S1)	Selects whether the % Reflected Power, % Input Power, % Forward Power, power supply voltage, or AGC voltage is to be viewed on the meter	
	<i>With Switch S1 in position</i>	<i>Display</i>
	% Refl (Reflected)	Reads the % Reflected Output Power (<10%)
	% Input	Reads the % Input Power to the tray (10%)
	% Forward Power	Reads the % Forward Power (100%=3 watts CW)
	P.S. Voltage	Reads the power supply voltage (+24 VDC)
	AGC Voltage	Reads the AGC voltage (2 VDC)

Table 8-7. 3-Watt Amplifier Tray Fault Indicators

FAULT INDICATOR	FUNCTION
Overtmp (DS1)	Indicates that the temperature of the heatsink, where the Q1 and Q2 current-pass transistors for the +24 VDC power supply are mounted, is above 175° F as sensed by the thermal switch (S2) mounted to the heatsink. When this fault occurs, the Enable to the isolation relay is removed immediately.
AGC Override (DS2)	Indicates that the level out of the 3-watt amplifier board has requested the AGC circuit to exceed the AGC limits. The fault is generated on the AGC board in the 3-watt amplifier tray.

8.5.3 250-Watt Amplifier Trays

Table 8-8. 250-Watt Amplifier Tray Meters

METER	FUNCTION	
Meter (A12)	Reads power in terms of a percent of the calibrated power output value. A full-scale reading is 100%, which is equivalent to the full-rated 250 watts peak of sync visual + aural output power. Also reads % Reflected Power, power supply voltage levels, and AGC voltage levels.	
	With Switch S1 in Position	Display
	Switch (S1), Meter	Selects the desired % Power or the voltage reading
	% Output Pwr	Reads the % Output Power of the tray (100%=250 watts peak of sync visual with -10 dB aural on the top scale)
	% Refl (Reflected)	Reads the % Reflected Output Power of the tray (<10%)
	Power Supply	Reads the power supply voltage, +26.5 VDC, on the middle scale

Table 8-9. 250-Watt Amplifier Tray Status Indicators

STATUS INDICATOR	FUNCTION
Enable (DS1 Green)	Indicates that an Enable, Operate, command, is applied to the UHF amplifier tray from the selected UHF exciter tray
Overtemp (DS2 Red)	Indicates that the temperature of (A1-A7 and A1-A8), one or both of the two thermal switches mounted on the heatsink assembly for the output amplifiers, is above 175° F. When this fault occurs, the Enable to the switching power supply in the affected amplifier tray is removed immediately and will shut down.

8.5.4 10-kW Amplifier Assembly Metering Control Panel

Table 8-10. 10-kW Amplifier Assembly Meters

METER	FUNCTION	
Voltage Meter (M1)	Reads DC voltage (a full-scale reading is 1 volt) <u>Note: A multiplier, whose value is dependent on which position switch S1 is in, must be applied. The multiplier that is needed is marked in parentheses near the switch.</u>	
	<i>With Switch S1 in Position</i>	<i>Display</i>
	Switch (S1) Voltage Meter	Selects the desired plate voltage, screen voltage, bias voltage, and filament voltage readings
	Plate (x10 k)	Reads the plate voltage (typical reading is 5200 volts)
	Screen (x1 k)	Reads the screen voltage (typical reading is 500 volts)
	Bias (x1 k)	Reads the bias voltage (typical reading is 85 volts)
	Filament (x10)	Reads the filament voltage (typical reading is 5.2 volts; black heat voltage is 1.5 volts)
Current Meter (M2)	Reads DC current (a full-scale reading is 50 mA) <u>Note: A multiplier, whose value is dependent on which position switch S2 is in, must be applied. The multiplier that is needed is marked in parentheses near the switch.</u>	
	<i>With Switch S2 in Position</i>	<i>Display</i>
	Switch (S2), Current Meter	Selects the desired plate current, screen current, and control grid current readings
	Plate (x100)	Reads the plate current (a typical reading is 1.5 amps, no RF drive, to 4 amps; 100% power, sync-only)
	Screen (x2)	Reads the screen current (typical reading is <60 mA)
	Control Grid (x1)	Reads the control grid current (typical reading is 0 mA to 5 mA) <u>Note: The meter reverse switch (S3) must be switched down to give an upscale reading.</u>

METER	FUNCTION	
Power Meter (M3)	Reads power in terms of a percent of the calibrated power value (a full-scale reading will be 100%)	
	<i>With Switch S4 in Position</i>	<i>Display</i>
	Switch (S4), Power Meter	Selects the desired visual output power, aural output power and the reflected output power readings
	Visual Output	Reads the visual output power of the 10-kW amplifier (100%)
	Aural Output	Reads the aural output power of the 10-kW amplifier (100%)
	Reflected	Reads the reflected visual output power from the 10-kW amplifier (<10%)

Table 8-11. 10-kW Amplifier Assembly Switches

SWITCH	FUNCTION
Meter Polarity (S3)	Changes the polarity of the measured current applied to the meter. To properly read the plate I and screen I, the meter polarity switch must be in the Up (+) position to give an upscale reading. To read the control grid I properly, the switch must be in the Down (-) position. The normal setting of the meter reverse switch is the Up position.
Transmitter (S5)	The momentary switch (S5) applies a ground to K3, a latching Operate/Standby relay on (A7) the transmitter control board. K3 switches either to Operate or to Standby depending on which direction S5 is pushed. When S5 is switched to Operate, a low Operate (Enable) command is applied to (A1) the control logic board to start the automatic turn-on procedure for the 10-kW transmitter. The opposite occurs when S5 is switched to Standby.
Mode Select (S6)	The momentary switch (S6) applies a ground to K1, a latching Auto/Manual relay on (A7) the transmitter control board. K1 switches the transmitter to Automatic or Manual depending on which direction S6 is pushed. In Automatic, a video fault command from the upconverter tray controls the transmitter. The transmitter switches to Standby if the video input is lost and will switch to Operate when the video is reapplied. In Manual, the transmitter is controlled through the normal automatic

SWITCH	FUNCTION
	turn-on sequence with the operator using the front panel controls or remote control.
HV (High Voltage) (S7) Enable/Disable	When the switch is enabled (Up), the magnetic latching relay (K1) on (A1) the control logic board will engage. The high-voltage enable indicator will light along with the High-Voltage Request LED. The High-Voltage On command to the high-voltage relay will be applied at the proper time during the automatic turn-on sequence. When switched to Disable, the High-Voltage On command will be removed, disabling the high voltage and causing the Automatic Off Cycle sequence to occur.
Output Power (S8)	Adjusts the output power level of the transmitter by raising or lowering the ALC level on the visual ALC/AGC board in the UHF exciter tray. This control is used to compensate for the small, everyday variations in the output power level. If a major variation occurs, a problem exists. After the problem has been repaired, the output power level adjustment may also require a readjustment to the AGC voltage levels (refer to the system setup procedures in Chapter 3 of this manual).
Fault Reset (S9)	As a fault occurs in the transmitter, the Fault LED will flash on and then go off as the transmitter automatically resets itself to try to eliminate the problem. If the problem remains, the transmitter will try to reset itself three times in approximately one minute. After this, the Three-Fault indicator will remain lit and the transmitter will automatically shut down. When the problem that caused the fault is found and repaired, the Fault Reset switch S9 must be set before the transmitter will recycle.
Driver Mode (S10) Normal/Test	When the switch is in Normal (Up), the transmitter operates normally. When the switch is in Test (Down), the magnetic latching relay (K4) on (A7) the transmitter control board supplies the driver Enable to the exciter/driver assembly. This allows the operation of the exciter/driver assembly without requiring the 10-kW amplifier section to be on. When this function is being performed, the driver must be terminated into a dummy load and the high voltage must be disabled.

Note: The circuit breakers discussed in Table 8-12 are on the AC distribution panel of the 10-kW amplifier and the high-voltage power supply assembly. For the other circuit breakers on the panel to operate, the main AC and the control circuit breakers must both be switched on.

Note: When the preceding command is completed, the automatic turn-on procedure will cycle the transmitter through the command status and corresponding operating status steps from left to right on the front panel LEDs. The Command Status indicator shows that a command has been given and the Operating Status indicator shows that the command has been carried out.

Table 8-12. 10-kW Amplifier Assembly Command Status Indicators

STATUS INDICATOR	FUNCTION
Blower (DS8)	Indicates that the Blower On command (Enable) has been given by the control logic. The blower is controlled by the filament power supply control board that sends a low Enable command to the isolation relay on the blower assembly. The relay energizes and the closed contacts apply 220 VAC to the blower contactor K1. If the blower circuit breaker is turned on, the 208/240 VAC 3 phase is applied to (A1) the blower and the unit will operate.
Filament (DS9)	Indicates that the blower is on and that the Filament On command (Enable) has been given to the filament power supply assembly. If the black heat has been applied to the filament for at least 10 minutes, the Operate command activates the ramp-up phase of the filament power supply.
Bias (DS10)	Indicates that the filament voltage has been at 5.2 volts for approximately 20 seconds and the Bias On command (Enable) has been given to the isolation relay (A3) on the control and bias power supply assembly. The relay energizes and, when the bias circuit breaker is turned on, applies 220 VAC to the bias power supply board.
High Voltage (DS11)	Indicates that the bias voltage is on and the High Voltage On command (Enable) has been given to the isolation relay (A24) in the high-voltage power supply assembly. The relay energizes and applies +12 VDC to the (A18) isolation relay and (K1) the contactor control relay that control the step-start and high-voltage contactors. When the main AC and HV circuit breakers are turned on, 208/240 VAC is applied to the transformer of the high-voltage power supply.

STATUS INDICATOR	FUNCTION
Screen (DS12)	Indicates that the high voltage (plate voltage) is on and the Screen On command (Enable) has been given to the isolation relay (A7) mounted in the screen power supply assembly. The relay energizes and, when the screen circuit breaker is switched on, applies 220 VAC through the Sola 60 Hz regulator to the transformer (T1) that is part of the screen power supply.
RF Request (DS13)	Indicates that the tube has all of the voltages applied and that the RF On command (Enable) has been given to enable the exciter/driver assembly that applies the RF drive to the 10-kW amplifier

Table 8-13. 10-kW Amplifier Assembly Operating Status Indicators

STATUS INDICATOR	FUNCTION
Blower (DS16)	Indicates that the blower is on. The quantity of air flow through the exhaust stack is measured by the air pressure sensor.
Filament (DS17)	Indicates that the above step is complete and that the filament voltage is on. This is indicated when the filament voltage on sense at J12-11 of the control logic board is low.
Bias (DS18)	Indicates that the above steps are complete and the bias voltage is on. This is indicated when the bias on sense at J13-2 of the control logic board is low.
High Voltage (DS19)	Indicates that the above steps are complete and the high voltage is on. This is indicated when the high voltage on sense at J13-8 of the control logic board is low.
Screen (DS20)	Indicates that the above steps are complete and the screen voltage is on. This is indicated when the screen voltage on sense at J13-14 of the control logic board is low.
RF Present (DS21)	Indicates that the above steps are complete and that there is an RF output from the transmitter. This is indicated when there is a forward power sample fed to (J15 - 7 and 6) of the transmitter control board.

Table 8-14. 10-kW Amplifier Assembly Fault Indicators

FAULT INDICATOR	FUNCTION
Over Temp (DS22)	Indicates that the air temperature in the exhaust stack is above 200° F as sensed by the thermal switch (A15-S1) mounted there. When this fault occurs, the voltages will be immediately removed from the tube, but the blower will continue running to cool the transmitter.
VSWR Cutback (DS23)	Indicates that the reflected output power of the transmitter, as sampled at (J15 - 1 and 2) of the transmitter control board, has exceeded 10%; this causes the 10-kW amplifier to cut back the output power level needed to maintain a 10% visual reflected level. If the reflected output power level exceeds 15%, a VSWR fault will occur and cause the transmitter to shut down.

8.6 Remote Control Interface Connections

The remote control interface connections for the 840A transmitter are listed in the following tables.

Table 8-15. 10-kW Amplifier Assembly Remote Control Interface Connections

FUNCTION	REMOTE JACK/PIN NUMBER	INTERFACE TYPE
Interlock (Total Shutdown)	J1-1	May be connected to a remote interlock
Interlock (Total Shutdown) Rtn	J1-2	
Interlock (Drv, Scrn, and high voltage)	J1-3	May be connected to a remote interlock
Interlock (Drv, Scrn, and high voltage) Rtn	J1-4	
Note: The jumper plug (1176-1019), with jumpers connected between pins 1 and 2 and 3 and 4, must be plugged into jack (J1) for the normal operation of the transmitter.		
Remote Status Indications		
Transmitter Operate Ind	J4-1	50 mA max current sink
Transmitter Operate Rtn	J4-2	
Transmitter Auto Mode Ind	J4-3	50 mA max current sink
Transmitter Auto Mode Rtn	J4-4	
High Voltage Enable Ind	J4-5	50 mA max current sink
High Voltage Enable Ind Rtn	J4-6	
Fault Ind	J4-7	50 mA max current sink
Fault Ind Rtn	J4-8	
RF Present Ind	J4-9	50 mA max current sink
RF Present Ind Rtn	J4-10	
Overtemp Ind	J4-11	50 mA max current sink
Overtemp Ind Rtn	J4-12	
VSWR Cutback Ind	J4-14	50 mA max current sink
VSWR Cutback Ind Rtn	J4-15	
Video Fault Ind	J4-16	50 mA max current sink
Video Fault Ind Rtn	J4-17	

FUNCTION	REMOTE JACK/PIN NUMBER	INTERFACE TYPE
Remote Commands		
Operate Cmd	J5-1	Contact closure
Operate/Standby Cmd Rtn	J5-2	
Standby Cmd	J5-3	Contact closure
Auto Mode Select Cmd	J5-4	Contact closure
Auto/Manual Select Cmd Rtn	J5-5	
Manual Select Cmd	J5-6	Contact closure
H.V. Enable Cmd	J5-7	Contact closure
H.V. Enable/Disable Cmd Rtn	J5-8	
H.V. Disable Cmd	J5-9	Contact closure
Power Raise Cmd	J5-10	Contact closure
Power Raise/Lower Cmd Rtn	J5-11	
Power Lower Cmd	J5-12	Contact closure
Fault Reset Cmd	J5-13	Contact closure
Fault Reset Rtn	J5-14	
Remote Metering		
Reflected Power Metering	J6-1	1V full scale at 1 k Ω source resistance
Reflected Power Rtn	J6-2	
Visual Forward Power Metering	J6-3	1V full scale at 1 k Ω source resistance
Visual Forward Power Rtn	J6-4	
Plate Current Metering	J6-5	1V full scale at 1 k Ω source resistance
Plate Current Rtn	J6-6	
Screen Current Metering	J6-7	1V full scale at 1 k Ω source resistance
Screen Current Rtn	J6-8	
Control Grid Current Metering	J6-9	1V full scale at 1 k Ω source resistance
Control Grid Current Rtn	J6-10	
Plate Voltage Metering	J6-11	1V full scale at 1 k Ω source resistance
Plate Voltage Rtn	J6-12	
Screen Voltage Metering	J6-13	1V full scale at 1 k Ω source resistance
Screen Voltage Rtn	J6-14	
Bias Voltage Metering	J6-15	1V full scale at 1 k Ω source resistance
Bias Voltage Rtn	J6-16	

FUNCTION	REMOTE JACK/PIN NUMBER	INTERFACE TYPE
Filament Voltage Metering	J6-17	1V full scale at 1 kΩ source resistance
Filament Voltage Rtn	J6-18	
Aural Forward Power Metering	J6-20	1V full scale at 1 kΩ source resistance
Aural Forward Power Rtn	J6-21	
<u>Note: The remote control interface connections for the 10-kW amplifier connect to jacks J1, J4, J5, and J6 of (A10) the remote control and cabinet interface assembly mounted to the rear and at the top of the amplifier cabinet.</u>		

The remote connections listed in Table 8-16 are only made if the (A12) A/V input and remote interface assembly are present in the system. The remote connections are made to jacks J9 and J10 on the assembly. Refer to the interconnect drawing (1064945) for the proper pin remote connections.

Table 8-16. UHF Exciter Remote Control Interface Connections

FUNCTION	REMOTE CONTROL/PIN NUMBER	INTERFACE TYPE
Transmitter Enable Interlock	J9-21	J9-21 and 22 must be jumpered together for normal operation; (1176-1038) jumper jack should be used
Transmitter Enable Interlock Rtn	J9-22	
Remote Control Commands		
Transmitter Standby (Disable)	J9-9	Contact closure
Transmitter Standby/Operate Rtn	J9-10	
Transmitter Operator (Enable)	J9-11	Contact closure
Transmitter Manual	J9-15	Contact closure
Transmitter Auto/Manual Rtn	J9-16	
Transmitter Auto	J9-17	Contact closure
Power Level Raise (optional)	J9-27	Contact closure
Pwr Lvl Raise/Lower Rtn (optional)	J9-28	
Power Level Lower (optional)	J9-29	Contact closure
Modulator Select (optional)	J9-31	Contact closure
Modulator Select Rtn (optional)	J9-32	

FUNCTION	REMOTE CONTROL/PIN NUMBER	INTERFACE TYPE
Remote Status Indications		
Transmitter Operate (Enable) Ind	J9-12	50 mA max current sink
Operate/Standby Ind Return	J9-13	
Transmitter Standby (Disable) Ind	J9-14	50 mA max current sink
Transmitter Auto Indicator	J9-18	50 mA max current sink
Auto/Manual Indicator Return	J9-19	
Transmitter Manual Indicator	J9-20	50 mA max current sink
VSWR Cutback Indicator	J9-23	50 mA max current sink
VSWR Cutback Indicator Return	J9-24	
Video Loss (Fault) Indicator	J9-25	50 mA max current sink
Video Loss (Fault) Ind Rtn	J9-26	
Receiver Fault (optional)	J9-30	
Remote Metering		
Reflected Power	J9-5	1V full scale at 1 kW source resistance
Reflected Power Rtn	J9-6	
Exciter Output Power	J9-7	1V full scale at 1 kW source resistance
Exciter Output Power Rtn	J9-8	

Table 8-17. UHF Amplifier Tray Remote Control Interface Connections

FUNCTION	REMOTE JACK/PIN NUMBER	INTERFACE TYPE
Metering		
3-watt Fwd Pwr Mtrg	J10-16	1V at 1K Ω source resistance
3-watt Fwd Pwr Mtrg Rtn	J10-17	1V at 1K Ω source resistance
250-watt amp A7 Fwd Pwr Mtrg	J10-6	1V at 1K Ω source resistance
250-watt amp A7 Fwd Pwr Mtrg Rtn	J10-7	1V at 1K Ω source resistance
250-watt amp A7 Refl Pwr Mtrg	J10-8	1V at 1K Ω source resistance
250-watt amp A7 Refl Pwr Mtrg Rtn	J10-9	1V at 1K Ω source resistance
250-watt amp A6 Fwd Pwr Mtrg	J10-1	1V at 1K Ω source resistance
250-watt amp A6 Fwd Pwr Mtrg Rtn	J10-2	1V at 1K Ω source resistance
250-watt amp A6 Refl Pwr Mtrg	J10-3	1V at 1K Ω source resistance
250-watt amp A6 Refl Pwr Mtrg Rtn	J10-4	1V at 1K Ω source resistance
Note: These remote connections are made only if the optional (A12) A/V input and remote interface assembly are present in the system. The remote connections are made to jacks J9 and J10 on the assembly. Refer to the interconnect drawing (1064945) for the proper pin remote connections.		