

## 8. OPERATIONAL DESCRIPTION - MODEL Axcera-DT835A-6

### 8.1 General Description

The DT835A-6 is a complete 3000-watt UHF solid-state, digital television transmitter. It operates at a nominal output power of 3000 watts average.

### 8.2 Technical Specifications

Type of Emission .....6M00K1D  
Frequency Range.....470 MHz to 608 MHz and 614 to 806 MHz  
Output Power..... 3000 watts average

### 8.3 Performance Specifications

Operating Frequency Range.....470 MHz to 608 MHz and 614 to 806 MHz  
RF output - Nominal:  
    Power ..... 3000 watts average  
    Impedance ..... 50 ohms  
    Connector ..... 3-1/8" EIA  
Regulation of Output..... 3%  
Signal-to-Noise Ratio (SNR)..... 27 dB or better  
Carrier Frequency Stability.....  $\pm 1000$  Hz  
Out of Band:  
Compliant with FCC Mask  
(Measured in 30 KHz RBW, relative to total average power)  
Channel Edge  $\pm 500$  KHz..... -47 dB or better  
6 MHz Channel Edge .....-110 dB or better

Data Interface:  
Input Rate..... 19.39 Mbps, 6 MHz Channel  
Input Interface..... SMPTE 310M, Serial Differential ECL & TTL

#### Electrical Requirements

Power Line Voltage .....230 volts, 1 phase or 3 phase 50/60 Hz  
Power Consumption .....20,500 watts

#### Environmental

Maximum Altitude .....8,500 feet  
Operational Temperature Range .....0°C to +50°C

Mechanical

## Dimensions:

Width .....	66 inches
Depth .....	34 inches
Height.....	80 inches
Weight.....	1650 lbs

**8.4. System Overview**

The DT835A-6 is made up of the trays/assemblies listed in Table 8-1.

*Table 8-1. DT835A-6 Major Trays and Assemblies*

<b>MAJOR ASSEMBLY DESIGNATOR</b>	<b>TRAY/ASSEMBLY NAME</b>
A1	DM8 Digital Modulator
A2	UHF Exciter
A3, A4	Variable Phase/Gain
A5-A6	Amplifier Array

**8.4.1 UHF Exciter Tray**

The UHF Exciter Assembly contains a UHF Exciter Tray (1142445), two Variable Gain/Phase Trays (1245-1200), a Metering Panel (1061456), an AC Distribution Assembly, Exciter (1245-1500) and a Remote Interface Assembly (1061198).

The UHF Exciter Tray (1142445), takes the Digital IF Input that is upconverted to the On Channel RF by mixing it with a L.O. signal generated by the Channel Oscillator Assembly. The RF Output of the UHF Exciter at J15 connects to a Splitter, which splits the RF two ways with the RF Output #1 connected to the input of the 1st Variable Gain/Phase Tray (1245-1200) and RF Output #2 connected to the input of the 2nd Variable Gain/Phase Tray (1245-1200). The output of the 1st Variable Gain/Phase Tray connects to the Side A Amplifier Assembly (1278-1300). The output of the 2nd Variable Gain/Phase Tray connects to the Side B Amplifier Assembly (1278-1300).

**8.4.1.1 Control and Status**

The Control and Status of the Transmitter are provided by the Meter indications on the Metering Panel and the Variable Gain Phase Trays. There are also Control, Status and LED Indications located on the front panel of the UHF Exciter Tray. The switches and LED indicators, which are mounted so that the switches and LEDs are operated or viewed from the front Panel of the UHF Exciter, are part of the Transmitter Control Board (1245-1101). On the UHF Exciter Tray, switch (S1) is an Operate/Standby Switch that provides the Operate Commands (Enables), when in Operate, to each of the Amplifier Arrays. The Enable is needed to turn on the Switching Power Supplies located in each of the UHF Amplifier Trays. When the UHF Exciter is in Operate, the Green LED (DS2) is On and when in Standby the Amber LED (DS1) is On. **NOTE:** If the Transmitter does not switch to Operate, when S1 is switched to Operate, check that a Dummy Jumper Plug is connected to Jack J7, with a Jumper between Pins 1 & 2, located on (A9) the Remote Interface Assembly in the Single UHF Exciter Assembly. The Jumper provides the Interlock to the UHF Exciter needed for the operation of the

Transmitter. If the Interlock is present, the Green LED (DS5), located on the Transmitter Control Board, should be lit.

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

#### **8.4.1.2 Digital Input and Remote Connections**

The Digital Input to the Transmitter, connects to the (A9) Remote Interface Panel located on the rear of the Single UHF Exciter Assembly. The Digital Input connects to Jack J2 that is cabled to J2 on the DM8-R Modulator.

Remote Monitoring and Operation of the Transmitter is provided through the Jacks (J8, J9 & J10) located on the Remote Interface Assembly mounted toward the rear of the Single UHF Exciter Assembly. Jack (J7) should have a dummy plug connected to it, which has a jumper connected between Pins 1 & 2, that provides the Interlock to the Exciter needed to operate the Transmitter. If the Jumper is missing, the Transmitter will not switch to Operate. If remote connections are made to the Transmitter, they should be made through the plugs provided in the Installation Material as noted on the Interconnect Drawing (1056919 or 1278-8400) for the Single UHF Exciter.

#### **8.4.1.3 AC Input**

The Single UHF Exciter Assembly needs an AC input of 208/240 VAC at 20 Amps. The AC Input to the Single UHF Exciter Assembly connects to the AC Distribution Assembly, UHF Exciter Assembly (1245-1500) located in the right, center rear of the Cabinet. The Assembly contains the 4 Terminal Block (TB1) to which the 208/240 VAC connects. Line 1 to TB1-1, Line 2 to TB1-3 and Safety Ground to TB1-2. The AC Distribution Panel contains one Circuit Breaker that supplies the AC to the rest of the Single Exciter Assembly.

The Input AC is connected to (CB1) the Main AC Circuit Breaker (20 Amps). The output of CB1 has three MOVs, VR1, VR2 and VR3, connected to it, one connected from each leg of the Input AC to ground and one across the two legs. The AC output of CB1 connects to the IEC Outlet Strips. The Exciter and the Variable Gain/Phase Tray plug into the IEC Outlet Strip. The Variable Gain/Phase Tray, the Metering Panel plug into the IEC Outlet Strip.

When the Circuit Breaker CB1, mounted on the AC Distribution Assembly, is switched On, +12 VDC from the Exciter, is supplied to each of the Amplifier Array Cabinets for the operation of the LED Status Indicators in each of the UHF Amplifier Trays.

#### **8.4.2 Variable Phase/Gain Tray**

The Variable Phase/Gain Tray sets the phase and gain adjustments of the RF to provide maximum output when the outputs of the two Amplifier Arrays are combined. There are two Variable Phase/Gain Trays in the DT835A UHF Transmitter, each controlling the phase and gain of one of the two Amplifier Arrays.

The Tray is made up of a Variable Phase/Gain Assembly (1245-1204), which contains a Variable Phase/Gain Board (1245-1201), a Metering Board (1245-1202) and a +15V/-12V Power Supply Board (1245-1203).

The RF Input signal connects to the rear panel of the Tray at J1 and is cabled to J1 on the Variable Phase/Gain Board (1245-1201) that is mounted inside the Variable Phase/Gain Assembly (1245-1204) for RFI and EMI protection. The Variable Phase/Gain Board contains two main circuits, one for ALC and one for Phase adjustment of the RF signal. A front panel mounted ALC adjust Pot connects through the Metering Board (1245-1202) to J5 on the Board which controls the output level to the tray. A front panel mounted Phase adjust Pot connects through the Metering Board to J4 on the Variable Phase/Gain Board which controls the phasing of the RF output. The Phasing adjust is needed to phase the two RF outputs of the Amplifier Arrays, when they are combined, to achieve maximum output. The phase and level controlled RF signal connects to J2 of the Variable Phase/Gain Board which connects to the RF Output Jack J3 located on the rear panel of the Tray. A sample of the RF from the Variable Phase/Gain Board connects to J4 the output Sample Jack located on the front panel of the Tray.

A detected output sample level connects to the Metering Board at J7 Pins 3 & 4, which is connected to the % Power Level position on the front panel meter of the Tray. S1 is a two position front panel mounted switch that allows the operator to view the ALC Level, typically reads .6V - 1V, or the % Power, which is calibrated for 100 %.

The +15 VDC and -12 VDC needed to operate the boards in the Tray are generated on the +15 VDC/-12 VDC Power Supply Board (1245-1203). 120/240 VAC connects to the Tray at J2 on the Power Entry Module Assembly. Jumpers on the Power Entry Module are set for the desired AC Voltage Input. The assembly contains an On/Off Switch, two 4 Amp Fuses and three Varistors for AC line protection. The AC is connected to a step down Toroid that supplies an 18 VAC output to the +15VDC/-12VDC Power Supply Board. The +15VDC/-12VDC Power Supply Board supplies voltage regulated +15 VDC and -12 VDC Outputs to the rest of the Tray. The Green LED DS1 is lit if +15 VDC is present and the Green LED DS2 is lit if -12 VDC is present at the output of the +15V/-12V Power Supply Board.

### 8.4.3 Amplifier Array

There are two Amplifier Array Assemblies in the DT835A-6 UHF Solid State Digital Television Transmitter. The Amplifier Array Assemblies (1278-1300) are identical. Each Amplifier Array contains an 8 Way Splitter (ZFSC-8-43), four to six outputs of the splitter are used, depending on output power, UHF Amplifier Trays (1281-1100), the number used depending on the output power needed, a 4, 5 or 6 Way Combiner, depending on the output power needed, an Output Coupler (1016-1043), an AC Distribution Assembly (1278-1200) for Single Phase AC Input or (1278-1100) for Three Phase AC Input and an Interface Panel. The Amplifier Array contains a Reject Load Assembly (1278-1312).

The output of the 1st Variable Phase/Gain Tray, located in the Exciter Assembly, connects to the Side A Amplifier Assembly (1278-1300). The output of the 2nd Variable Phase/Gain Tray connects to the Side B Amplifier Assembly (1278-1300). The RF Input from the Variable Phase/Gain Tray connects to the RF Input Jack J1 on the Interface Panel located in the Amplifier Array Assembly. The RF is cabled to the COM Input of the 8 Way Splitter, which splits it eight ways maximum. Four to Six of

the RF outputs of the Splitter, depending on the output power needed, are connected to J1, the RF Input Jack on each of the UHF Amplifier Trays (1281-1100). The outputs of the Splitter that are not used are terminated with 50Ω. The RF Output of the Combiner is cabled to (A8) the Output Coupler Assembly (1016-1043). The Output Coupler Assembly supplies a Forward and a Reflected Power Sample of the output from the Amplifier Assembly, which connects through the SMA Connectors J2 and J3 located on the Interface Panel to the Metering Panel located in the UHF Exciter Assembly.

In each UHF Amplifier Tray, a Forward Power Sample and a Reflected Power Sample, from the 4 Way Combiner Board, are connected to the Dual Peak Detector Board, Single Supply, which provides peak detected forward samples to the Amplifier Control Board that supplies the samples to the front panel meter of the UHF Amplifier Tray and also to the Interface Panel for remote monitoring. Before exiting each UHF Amplifier Tray the RF is fed through a Circulator, which protects the Tray from high VSWR conditions. The Reject Port of the Circulator provides a Reject Sample to the 4 Way Combiner Board which supplies the Reflected Sample to the Dual Peak Detector Board, Single Supply located in the UHF Amplifier Tray that connects to the front panel meter. The outputs of the Amplifier Array Assemblies connect to a Hybrid Combiner (55223A), which combines the outputs into a single output.

The two Enable (Operate) Commands from the UHF Exciter Tray, located in the UHF Exciter Assembly, connect to the Terminal Block mounted in each Amplifier Array. The terminal block splits the Enables in each array and supplies them to all of the UHF Amplifier Trays. The Enable is needed to turn on the Switching Power Supply located in each UHF Amplifier Tray. If the Amplifier Array contains an External Exhaust Kit, then a Fan Enable is supplied at J4-19 with +12V at J4-20 that connect to the fan mounted on the roof, which turns it on.

#### **8.4.3.1 Main AC Input**

Each Amplifier Assembly needs an AC Input of 208/240 VAC at 100 Amps Single Phase or 208/240 VAC at 55 Amps Three Phase wired to it. The 208/240 VAC Input to each Amplifier Assembly connects to the AC Distribution Assembly, Amplifier Array (1278-1200 Single Phase or 1278-1100 Three Phase) located on the right side, center rear of each Cabinet. Each AC Distribution Assembly contains the Terminal Block (TB1) to which the 208/240 VAC connects. For Single Phase operation connect Line 1 to TB1-1A, Line 2 to TB1-3A and Ground to TB1-4A and for Three Phase operation, connect Line 1 to TB1-1A, Line 2 to TB1-2A, Line 3 to TB1-3A and Ground to TB1-4A. The AC Distribution Panel contains from five to seven Circuit Breakers that supply the AC to the rest of the Amplifier Assembly. The Input AC from TB1 is connected to (CB1) the Main AC Circuit Breaker (100 Amps for Single Phase or 80 Amps for Three Phase) which distributes the 220 VAC to the other circuit breakers (CB2-CB7). The CB6 and CB7 Circuit Breakers are used if the extra Amplifier Trays are needed. The output of CB1 has three MOVs, VR1, VR2 and VR3 for Single Phase or six MOVs VR1-VR6 for Three Phase, mounted to it, one connected from each leg of the Input AC to ground and one across the each of the legs.

The switched Input AC is wired through a maximum of six Circuit Breakers, CB2-CB7, to the UHF Amplifier Trays in the Amplifier Array Cabinets. Breakers CB8 and CB9 apply AC to the Fans located on the Reject Load Assembly.

When the Circuit Breaker CB1 on the AC Distribution Assembly in the UHF Exciter Assembly is switched On, +12 VDC from the Exciter is supplied to each of the Amplifier Array Cabinets. In the Amplifier Array, the +12 VDC is split and connected to each of the UHF Amplifier Trays in the Amplifier Assemblies for operation of the LED Status Indicators in the Tray.

#### **8.4.4 AC Distribution Assembly**

The AC Distribution Assembly, Single Phase, Amplifier Assembly (1278-1200) distributes the Main AC Input, 208/240 VAC @ 100 Amps, to the individual Trays in the Amplifier Cabinet which make up the Amplifier Array.

The 208/240 VAC Single Phase Main AC Input to the Amplifier Cabinet connects to the Terminal Block TB1, Line 1 to TB1-1A, Line 2 to TB1-3A and Safety Ground to TB1-4A.

The 208/240 VAC Main AC Input is wired from the Terminal Block TB1-1B (Line 1) to the 100 Amp Circuit Breaker CB1-1 and TB1-3B (Line 2) to the Circuit Breaker CB1-5. The switched Main AC Input is wired from the main circuit breaker to the up to six 20 Amp Circuit Breakers, CB2-CB7, that distribute the AC to the up to six UHF Amplifier Trays in the Amplifier Array and two 3A circuit breakers CB8 and CB9 which connect the AC to the Fan (A12-A3) mounted on the Reject Load Assembly. The number of 20 Amp circuit breakers is determined by the number of Amplifier Trays, which is determined by the output power of the Transmitter in which the Amplifier Assemblies are used. Four circuit breakers, CB2-CB5, are needed for a 4 kW Transmitter, five circuit breakers, CB2-CB6, are needed for a 5 kW Transmitter and six circuit breakers, CB2-CB7, are needed for a 6 kW Transmitter. Three MOVs, for surge and transient protection, are connected to the AC Lines from the Circuit Breaker. VR4 and VR6 connect from the AC Lines to Ground and VR3 connects across the AC Lines.

CB2 is a 20 Amp Circuit Breaker, which protects the AC connected through J1 on the AC Distribution Assembly to J4 on the UHF Amplifier Tray. CB3 is a 20 Amp Circuit Breaker, which protects the AC connected through J2 on the AC Distribution Assembly to J4 on the (A2) UHF Amplifier Tray. CB4 is a 20 Amp Circuit Breaker, which protects the AC connected through J3 on the AC Distribution Assembly to J4 on the UHF Amplifier Tray. CB5 is a 20 Amp Circuit Breaker, which protects the AC connected through J4 on the AC Distribution Assembly to J4 on the UHF Amplifier Tray. CB6 and CB7 are 20 Amp Circuit Breakers that are added to the AC Distribution Assembly when the two extra UHF Amplifier Trays are needed for the 5 kW and 6 kW Transmitters. CB6 is a 20 Amp Circuit Breaker, which protects the AC connected through J5 on the AC Distribution Assembly to J4 on the UHF Amplifier Tray. CB7 is a 20 Amp Circuit Breaker, which protects the AC connected through J6 on the AC Distribution Assembly to J4 on the UHF Amplifier Tray.

#### **8.4.5 Metering Control Panel**

The Metering Panel provides three meters, one for Combined, one for Side A Amplifier Array and one for Side B Amplifier Array Outputs. The Side A Meter displays the % Forward and the % Reflected Power samples for the Side A Amplifier Array. The Side B Meter displays the % Forward and the % Reflected Power samples for the Side B Amplifier Array. The Combined Meter displays the % Reject, and Reflected Power samples for the Combined Output of the Transmitter. The Metering Panel also takes the ALC Reference Inputs from the Variable Phase/Gain Trays and splits them six ways, which are then connected to the UHF Amplifier Trays in the two amplifier arrays.



The Metering Panel contains four Splitter Boards (1181-1002), three Dual Peak Detector Modules (1555-1271 or 1159965), (A10) a Metering Board (1265-1309 or 1265-1325) and a  $\pm 12$ V Power Supply Board (1062-1013). The Front Panel Meter is for Combined Output Power, which is controlled by (S1) the Meter Control Switch, the Front Panel Meter is for Side A Output Power with (S2) the Meter Control Switch and the Front Panel Meter is for Side B Output Power with (S3) the Meter Control Switch.

The Splitter Board (1181-1002) takes the ALC reference from the 1st Variable Phase/Gain Tray and splits it six ways, which connect to the UHF Amplifier Trays mounted in the Side A Amplifier Array. The Splitter Board (1181-1002) takes the ALC reference from the 2nd Variable Phase/Gain Tray and splits it six ways, which connect to the UHF Amplifier Trays mounted in the Side B Amplifier Array.

The Metering Board has a Combined Forward Sample from the Output Coupler Assembly of the Transmitter connected to J1 on the Board where it is split. One Forward Sample connects to J2 on the board that is cabled to J9, the Transmitter Output Sample Jack, located on the front panel of the Metering Panel. The Combined Forward Sample on the Metering Board is split again with one Sample used to produce a Combined Sample, that connects to the front panel Meter and also to the rear panel for Remote monitoring. The other Combined Forward Sample produces a combined Sample that connects to the Splitter Board. The Splitter Board (1181-1002) takes the Combined Sample Input from the Metering Board and splits it. One of the split Samples connects to the front panel Meter and the other is used for Remote Monitoring.

The Dual Peak Detector Module takes the Combined Reflected Sample Input from the Output Coupler Module and splits it. A peak-detected sample of the reflected connects to the Splitter Board. The Splitter Board takes the Combined Reflected Sample Input and splits it. One of the split Combined Samples connects to the front panel Meter, one is used for Remote Monitoring and the other two connect back to the UHF Exciters for use in the VSWR Cutback circuitry. The Dual Peak Detector Module also has a Reject Sample Input from the Reject Output Coupler Module and splits it. One of the peak-detected split Reject Samples connects to the front panel Meter and the other is used for Remote Monitoring.

The Dual Peak Detector Module takes a Reflected Sample from the Side B Amplifier Array, which is peak-detected and connected to the front panel meter. Another input to the Dual Peak Detector Module is a Forward Sample from the Side B Amplifier Array, which is peak detected and connected to the front panel meter.

The Dual Peak Detector Module receives the Reflected Sample from the Side A Amplifier Array, which is peak-detected and connected to the front panel meter. Another input to the Dual Peak Detector Module is the Forward Sample from the Side A Amplifier Array, which is peak detected and connected to the front panel meter.

The  $\pm 12$  VDC needed to operate the Boards in the Metering Panel are provided by the  $\pm 12$ V Power Supply. The AC Input connects to J8 on the Power Entry Module Assembly (1227-1206). The input AC connects to a step down Toroid whose outputs are wired to the  $\pm 12$  VDC Power Supply Board (1062-1013). The  $\pm 12$  VDC outputs of the board are connected to the rest of the boards in the Metering Panel.

#### **8.4.6 DM8 –Digital Modulator Module**

The DM8-R modulator Tray is an ATSC compliant 8 VSB modulator that mounts in a standard 19" rack. The DM8-R modulator accepts a SMPTE-310 MPEG data stream and outputs a 6 MHz wide IF output centered at 44 MHz with a pilot carrier at 46.69 MHz. The DM8-R modulator provides linear and nonlinear correction capability for the transmission path as well as internal test sources that are used during initial transmitter installation. All of the functions of the DM8-R modulator are controlled from the Controller LCD display and pushbuttons.



## 8.5 Control and Status

### 8.5.1 UHF Exciter Tray

Table 8-3. UHF Exciter Tray samples

<b>SAMPLE</b>	<b>DESCRIPTION</b>
f(s)	A sample of the channel oscillator output taken from the sample jack of the PLL board
Exciter O/P	An output power sample of the exciter taken from the UHF upconverter board

Table 8-4. UHF Exciter Tray Switches

<b>SWITCH</b>	<b>FUNCTION</b>
Transmitter (S1) Operate/Standby	The momentary contact 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, a low, Enable command, is applied to the UHF amplifier trays mounted in the amplifier arrays. These Enables will turn on the UHF amplifier trays. The opposite occurs when the transmitter is switched to Standby.
Mode Select (S2) Auto/Manual	The momentary contact 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 Modulation 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 input modulation is lost and will quickly switch back to Operate when the modulation is restored. In Manual, the transmitter is controlled by the operator using the front panel Operate/Standby switch or by remote control.

Table 8-5. UHF Exciter Tray Indicators

<b>FAULT INDICATOR</b>	<b>FUNCTION</b>
Modulation loss (DS9 red)	Indicates that the input has been lost to the transmitter. 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 transmitter has increased above 20%. This will automatically cut back the output power level to 20%. The fault is generated on the transmitter control board in the UHF exciter tray.

### 8.5.2 UHF Amplifier Tray

Table 8-6. UHF Amplifier Tray samples

SAMPLE	DESCRIPTION
Module O/P (0 dBm)	A sample of the combined output of the four dual-stage amplifier boards taken from the dual-peak detector board

Table 8-7. UHF Amplifier Tray Switches

METER	FUNCTION
<b>Meter (A9)</b>	Displays power in terms of a percent of the calibrated power output value. A full-scale reading is 100%, which is equivalent to 300 watts 8-VSB digital. Also reads % Reflected Power, power supply voltage levels, and AGC voltage levels.
Switch (S2), meter	Selects the desired % Power or the voltage reading
% Output pwr	Displays the % Output Power of the tray (100%=300 watts 8-VSB digital)
% Refl (Reflected)	Displays the % Reflected Output Power of the tray (<5% with all amplifier trays operating as measured on the top scale)
Power supply	Displays the power supply voltage, +26.5 VDC, on the middle scale
AGC voltage	Displays the AGC voltage level, +1 - +2 VDC, on the bottom scale

Table 8-8. UHF Amplifier Tray Indicators

INDICATOR	FUNCTION
Enable (DS4 green)	Indicates that an Enable, Operate command, is applied to the UHF amplifier tray from the selected UHF exciter tray
Overdrive (DS2 red)	Indicates that the level of the 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 (DS1 red)	Indicates that the reflected power level of the tray has increased above 50%. This will automatically cut back the output power level to 50%. The fault is generated on the amplifier control board.
Overtemp (DS3 red)	Indicates that the temperature of (A5-A6- A3 and A5-A6-A4), one or both of 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 immediately removed and it will shut down.
Input fault (DS5 red)	Indicates that the input RF level to the amplifier trays dropped below the 0 dBm range

### 8.5.3 Variable Gain/Phase Tray

Table 8-9. Variable Phase/Gain Tray Samples

<b>SAMPLE</b>	<b>DESCRIPTION</b>
Output (J4), (0 dBm)	A front panel sample of the RF output of the phase/gain tray, which connects to the amplifier array, taken from the variable gain/phase board

Table 8-10. Variable Phase/Gain Tray Switches

<b>METER</b>	<b>FUNCTION</b>
Switch (S1), meter	Selects the desired % Power or the ALC voltage reading
% Output Power	Displays the % Output Power of the amplifier array (100%= +15 dBm 8- VSB digital ≈45%)
ALC	Displays the ALC voltage from the UHF exciter that connects to the amplifier trays in the amplifier array (.6 - 1 VDC typical)

There are no external indicators on the Variable Phase/Gain Tray

### 8.5.4 Metering Control Panel

Table 8-11. Metering Control Panel Samples

<b>CONNECTOR</b>	<b>FUNCTION</b>
J9 - BNC	O/P Sample (front panel)

Table 8-12. Metering Control Panel Switches

METER	FUNCTION
Combination meter	Displays power in terms of a percentage of the calibrated transmitter output level on the scale; a full-scale reading is 120%
Switch (S1), meter	Selects the desired % Forward, % Reject, or % Reflected reading.
% Forward (0 - 120 %)	Displays the output power level ( $\approx 100\%$ )
% Reject (0 - 120 %)	Displays the % Reject Output Power ( $< 5\%$ )
% Reflected (0 - 120 %)	Displays the % Reflected Output Power ( $< 5\%$ )
Power meter side A	Displays power in terms of a percentage of the calibrated amplifier array output level on the scale; a full-scale reading is 120%
Switch (S2), meter	Selects the desired % Forward or % Reflected reading
Forward (0 - 120 %)	Displays the output level of the array ( $\approx 95\%$ )
% Reflected (0 - 120 %)	Displays the % Reflected Output Power of the array ( $< 5\%$ )
Power meter side B	Displays power in terms of a percentage of the calibrated amplifier array output level on the scale; a full-scale reading is 120%
Switch (S3), meter	Selects the desired % Forward or % Reflected reading
Forward (0 - 120 %)	Displays the output level of the array ( $\approx 95\%$ )
% Reflected (0 - 120 %)	Displays the % Reflected Output Power of the array ( $< 5\%$ )

Table 8-13. DM8 Digital Modulator Status Indicators

LED Indicator	Function
PWR	Indicates that the DC power supply is operating
MPEG LED	Indicates the presence of a valid MPEG stream at the J1-2B input
PLL A LED	Indicates that the DM8 symbol clock is locked to the frequency of the 10 MHz reference.
PLL B LED	Indicates that the pilot frequency is locked to the incoming 10 MHz reference.

**8.6 Remote Interface Connections, Transmitter**

FUNCTION	REMOTE JACK/PIN NUMBER	INTERFACE TYPE
Exciter Enable Interlock	J7-1	J7-1 and 2 must be jumpered together for normal operation.
Exciter Enable Interlock Rtn	J7-2	
Transmitter Remote Metering		
Combined Output Power	J10-7	1V full scale at 1kΩ source resistance
Combined Output Power Rtn	J10-8	
Combined Reflected Power	J10-9	1V full scale at 1kΩ source resistance
Combined Reflected Power Rtn	J10-10	
Exciter Output	J9-26	1V full scale at 1kΩ source resistance
Exciter Output Rtn	J9-27	
Exciter Remote Control Commands		
Exciter Operate (Enable)	J8-3	Contact closure
Exciter Standby/Operate Rtn	J8-2	
Exciter Standby (Disable)	J8-1	Contact closure
Exciter Auto	J8-6	Contact closure
Exciter Auto/Manual Rtn	J8-5	
Exciter Manual	J8-4	Contact closure
Power Raise (optional)	J9-6	Contact closure
Raise/Lower Rtn (optional)	J9-5	
Power Lower (optional)	J9-4	Contact closure
Exc Modulator Select (optional)	J8-10	Contact closure
Exc Modulator Select Rtn (optional)	J8-11	
Exciter Remote Status Indications		
Exciter Auto Mode Indicator	J9-30	50 mA max current sink
Auto/Manual Mode Ind Rtn	J9-31	
Exciter Manual Mode Indicator	J9-32	50 mA max current sink
Operate Indicator	J9-1	50 mA max current sink
Operate/Standby Ind Rtn	J9-2	
Standby Indicator	J9-3	50 mA max current sink

FUNCTION	REMOTE JACK/PIN NUMBER	INTERFACE TYPE
Exciter VSWR Cutback Indicator	J8-7	50 mA max current sink
Video Loss Indicator	J9-7	50 mA max current sink
Video Loss Indicator Rtn	J9-8	
Exc Receiver Fault Ind (optional)	J8-9	50 mA max current sink
Side A Driver Remote Metering		
Side A Driver Output Power	J10-1	1V full scale at 1kΩ source resistance
Side A Driver Output Power Rtn	J10-2	
Side B Driver Remote Metering		
Side B Driver Output Power	J10-3	1V full scale at 1kΩ source resistance
Side B Driver Output Power Rtn	J10-4	
Side A Remote Metering		
Side A Forward Power	J10-14	1V full scale at 1kΩ source resistance
Side A Forward Power Rtn	J10-15	
Side A Reflected Power	J10-16	1V full scale at 1kΩ source resistance
Side A Reflected Power Rtn	J10-17	
Side B Remote Metering		
Side B Forward Power	J10-20	1V full scale at 1kΩ source resistance
Side B Forward Power Rtn	J10-21	
Side B Reflected Power	J10-18	1V full scale at 1kΩ source resistance
Side B Reflected Power Rtn	J10-19	
Side A + B Remote Metering		
Reject Power	J10-11	1V full scale at 1kΩ source resistance
Reject Power Rtn	J10-12	
The above connections are made to jack (J9), the 37-position "D" connector; to jack (J10), the 25-position "D" connector; to jack (J8), the 25-position "D" connector; or to jack (J7), the 9-position "D" connector on (A9) the remote interface assembly mounted at the top, rear of the single UHF exciter cabinet.		