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June 1, 2004

INTRODUCTION

The 5720 series product line is designed with the user in mind. With the implementation of modular component technology, it is no longer necessary to perform component level repairs at the site. By simply replacing an entire module the unit is quickly ready to return to normal operation.

The unique hinged front panel eliminates the need to remove the unit from the cabinet for routine inspection and maintenance.

5720 series products can also be upgraded just by making a few simple adjustments and changing specific modules.

With additional features such as ability to connect to external amplifiers, change output power, and an optional spectral shaping filter, 5720 series products are versatile as well as cost effective.

This manual covers all power levels of the 5720 including the 5721, 5722, 5723, and 5724.

SYSTEM

Unpacking

Axcera certifies that upon leaving our facility all equipment was undamaged and in proper working order. It is imperative that all packages be inspected immediately when received to verify that no damage occurred in transit to the site.

- **Inspect all packages for exterior damage and make note of any dents, broken seals, or other indications of improper handling.**
- **Carefully open each package and inspect the contents for damage. Verify that all materials are enclosed as listed on the packing slip. Report any shortages to Axcera.**
- **In the event any in transit damage is discovered report it to the carrier. Axcera is not responsible for damage done by the carrier.**
- **If the equipment is not going to be installed immediately, return all items to their original packaging for safe storage.**
- **Save all packing material for future use. If equipment is ever removed from the site, the original packaging will ensure the safe transport of it. Keep at least one copy of all documentation including this manual at the site in a safe place.**

Installation

All 5720 series products are designed for simple installation with comprehensive instructions. Expensive test equipment is not required to keep a system operational, installation, and set up. Prior to installing the product review the checklist that follows.

- **Is the building structure where the equipment is to be placed properly prepared ? Listed below are systems and specifications that need to be operational prior to installation of transmission equipment.**

  Heating and Air Conditioning
  Electrical Systems
  Building Structure
  Antenna
  Satellite Dish
  Transmission Line

- **Have all the systems listed above been tested and / or inspected ?**

- **Is the space provided for equipment racks sufficient ? Will an additional devices that extend out above or to the side of the unit have sufficient clearance space ? Refer to the system custom racking plan for detailed specifications.**

Input Connections for Analog Operation:

Connect the Baseband Video Signal Input to J2, a 75 ohm BNC connector located on the rear of the tray.

Connect either the Baseband Balanced Mono Audio Signal Input to J11, a 600 ohm 3 terminal block connector located on the rear of the tray, or the Unbalanced Composite Stereo Audio Signal Input to J3, a 75 ohm BNC connector also located on the rear of the tray.

Input Connections for Digital Operation:

Connect the Digital IF Signal Input to J14, a 75 ohm BNC connector located on the rear of the tray.

NOTE: For connections using Scientific Atlanta and Pac-Mono scrambling, refer to that section which follows.

Output Connections for Typical Operation:

Connect RF Output of the tray at J8, a 50 ohm N connector, located on the rear of the tray, to the designated Channel Combiner or Spectral Shaping Filter for your system.

Check that CB1 the AC circuit breaker, located on the rear of the tray near the AC input Jack, is Off.

Connect the AC power cord the J1 on the rear of the tray and the plug end to an appropriate AC outlet.

System Description

5720 series transmitters are available in various power levels from 2.5 to 100 watts average power or 10 to 230 watts peak analog. Units can be factory set to a specific channel in the 2076-2700 MHz range. QAM signals up to M=256 as well as NTSC and PAL modulation can be processed by the unit. A center frequency of either 44 MHz or 36 MHz can be set at the factory prior to shipment.

All 5720 series transmitters are compatible with SCADA . Using SCADA allows operators to monitor and control systems from remote locations.

Digital / Analog MMDS Transmitter

5720

- Compatible with digital and analog modulation including 256 QAM, NTSC, and PAL
- Broad power range of 2.5 to 100 watts average digital power and 10 to 280 watts peak sync analog power
- Modular design simplifies installation, field service, and upgrades
- Hot-replaceable modules improve system availability
- Redundant design enables system to stay on the air even if an amplifier module fails
- Broadband amplifier design simplifies repairs and minimizes inventory
- High efficiency GaAsFETs reduce operating expenses and save space
- User friendly diagnostics with English, Portuguese, and Spanish text
- Adjacent and non-adjacent channel combining systems available
- SNMP Network Management System
- Automatic and manual backup systems available

The new 5720 series transmitters are the result of a global design strategy. All aspects of the product design, from frequency range to modularity, reflect a long term commitment to our global partners. These transmitters provide a platform which allows for simplified installation, field service and system upgrades. Axcera has taken significant steps to reduce system operating costs and size, while providing a solution that works for either analog or digital transmission.

Compatible with Digital and Analog Modulation
The 5720 series transmitters are compatible with digital and analog modulation including 256 QAM, NTSC, and PAL. An internal NTSC/ PAL modulator is available to save rack space.

5720 Series Provides Broad Power Range
Operators can select from 2.5 to 100 watts of average power, or 10 to 280 watts of peak sync analog power. Transmitters can be set for any channel in the 2076-2700 MHz frequency range.

Modular, Reliable Design
Modular design simplifies installation, field service, and upgrades. Modulator, IF, LO/ upconverter, amplifier, power supply, and transmitter control modules can be replaced in seconds. Each slide into a backplane with plug-in connectors. Surface mount technology improves system MTBF.

Axcera.

Modular design simplifies installation, field service, and system upgrades.

High Efficiency, Broadband Amplifiers
Axcera has selected the newest, most efficient GaAsFETs for the 5720 series. Redundant amplifier modules enable the system to stay on the air in the event of a failure. Amplifier modules are hot-replaceable so they can be removed and installed while the system is operating. Amplifiers are tuned broadband to simplify repair and reduce spares inventory. Feedforward and advanced equalization techniques are employed to meet the FCC spectrum mask for out-of-band performance specifications while minimizing power consumption.

Compact Size
A complete 31 channel system for 50W peak operation fits into just four racks. Even the new 8770 Filterplexer combiner can be configured for eight channels per rack. The 8770 Filterplexer is available for both adjacent and non-adjacent, analog or digital applications. Adjacent combining reduces the system purchase price because only one antenna and waveguide run are required.

Anytime, Anywhere Communication and Backup
With the SCADA system operators have real time remote and local control of the transmitter system and site. Graphic user interfaces simplify integration with Windows or UNIX based SNMP network management systems. Axcera 's automatic backup system permits a scaleable number of channels to be backed up per agile transmitter.

Turnkey Solutions and 24-Hour Support
At Axcera our transmitters, amplifiers, and channel combiners are manufactured and tested as a system to achieve the ultimate in performance and value. Our system integration group can document, install, and commission your entire digital MMDS transmitter system. Axcera field engineers are available to oversee analog to digital system conversions and provide on-site training. We offer a comprehensive range of support services that are designed to keep your transmitter system producing revenue year after year.

5720 Series

Specifications

Subject to change without notice

RF Performance	5721	5722	5723	5724	5725	5726	5727
RF Output Power (PEP Watts)	20	40	50	70	120	220	400
RF Output Power Digital (Avg. Watts)	2.5	5	10	15	25	50	100
RF Output Power Analog (Pk Sync Watts with -15dB Aural)	10	20	30	50	100	160	280

RF Output Frequency ..... Any 6, 7, or 8 MHz channel, 2076-2700 MHz
RF Output Impedance ..... 50 Ohms
Frequency Translation Stability[2] ..... ± 500 Hz standard (Precise ± 1 Hz optional)
Signal to Noise Ratio (6 MHz Bandwidth) ... 52 dB
Discrete Inband Spurious and Harmonic Products -60 dB relative to average digital power or to analog carrier

Out of Band Spurious Products[3] ..... Per FCC digital spectral mask; per FCC or CCIR system analog

Digital Performance
Phase Noise[4] (1 Hz Bandwidth 10 kHz from Carrier) £-110 dBc (single sideband measurement)
Frequency Response ..... ± 0.25 dB
Group Delay ..... 40 nsec peak-peak (Measured with 1 MHz delay aperture)
Gain Linearity (AM-AM[5]) ..... 0.2 dB /dB
Phase Linearity (AM-PM[5]) ..... 1°/dB
IF Input Frequency ..... 41-47 MHz or 32-40 MHz
IF Input Impedance ..... 75 or 50 Ohms (specify)
IF Input Level ..... +20 to +40 dBmV (-28 to -8 dBm) average

Analog Visual Performance[6]
Frequency Response ..... ± 1.0 dB
Differential Gain 5%
Differential Phase ..... ± 3°
ICPM ..... ± 3°
Envelope Delay ..... Per FCC or CCIR system
Video Input Impedance ..... 75 Ohms
Video Input Level ..... 1 V p-p
Emission Designator ..... 5M75C3F or per CCIR

Analog Aural Performance[6]
Output Power ..... -15 dB relative to visual power
Frequency Deviation Capability ..... Up to ±75 kHz
Harmonic Distortion 0.5%
FM Noise ..... -55 dB

FCC TYPE ACCEPTED

Frequency Response ..... ± 1 dB 50 Hz-15 kHz Baseband Input
± 1 dB 50 Hz-100 kHz Composite Input
Pre-emphasis (Baseband Input) ..... 50 or 75 msec (defeatable)
Audio Input Impedance ..... 600 Ohms balanced Baseband Input
75 Ohms unbalanced Composite Input
Audio Input Level ..... 0 to 10 dBm Baseband Input
1V p-p Composite Input
Emission Designator ..... 250KF3E or per CCIR

1. These devices have not been approved by the Federal Communications Commission. These devices are not, and may not be offered for sale or sold in the United States until the approval of the FCC has been obtained.
2. When interfaced with 5060 10 MHz system reference or GPS precise reference.
3. Measured at output of the Channel Combiner or optional spectral shaping filter.
4. Measured with optional LPN oscillator.
5. Specified at 6dB above digital average power.
6. Measured with optional internal analog modulator.

5720 Series

Digital / Analog MMDS Transmitter

Specifications

Subject to change without notice

	5721	5722	5723	5724	5725	5726	5727
Inputs / Connectors	Video Input / BNC; Baseband Audio Input / Screw Terminals; Composite Audio Input / BNC; Visual IF Input / BNC; Aural IF Input / BNC; IF Input / BNC; 10 MHz Ref Input / BNC; IF CW Input / BNC; Remote Interface / D; Control Interface / D; SCADA / RJ45 (2 connectors)						
Outputs / Connectors	RF Output / N; Visual IF Output / BNC; Aural IF Output / BNC; Combined IF Output / BNC; RF Sample / SMA; LO Sample / SMA; IF Sample / SMA (2 connectors)						
Operational Temperature Range[7]	0°C to 45°C						
Specified Temperature Range[7]	15° C to 35° C						
Relative Humidity	0 to 95% non-condensing						
Dimensions (W x D x H)	19" x 21" x 7" (48.3 cm x 53.3 cm x 17.8 cm)				19" x 21" x 17.5" (48.3cm x 53.3cm x 31.1cm)	19" x 21" x 12.25" x (48.3cm x 53.3cm x 39.4cm)	
Line Voltage[8]	117-240 VAC ±10%, 50/60Hz						
Power Consumption (Watts)	250	380	380	520	875	1500	2880
Power Consumption (VA)	260	390	390	530	940	1620	3110
Weight	45 lbs. (20 kgs.)				100 lbs. (45 kgs.)	125 lbs. (57 kgs.)	165 lbs. (75 kgs.)

Monitoring

Front Panel ..... Front panel LCD/keypad displays forward power, reflected power, RF channel, ALC voltage, AFC voltage, IF input status, output power status, PLL locked status, external reference present status, amplifier module status, temperature fault status, power supply status, external amplifier module status, external amplifier temperature status, external amplifier power supply status, internal modulator PLL status, internal modulator input status; operate and fault LED indicators

SCADA ..... SNMP network management system for remote control and monitoring of output power, status, and operating mode via modem or LAN/WAN

7. RF performance specifications guaranteed over specified temperature range. Units will run reliably over operational temperature range but may deviate from specifications. Derate maximum operational temperature by 2° C per 1000 feet above sea level.

8. Amplifier trays for models 5725, 5726, 5727 require 208/240 VAC ± 10% 50/60 Hz line voltage.

Ordering Information

5721 10/2.5W peak/avg. transmitter
5722 20/5 W peak/avg. transmitter
5723 30/10 W peak/avg. transmitter
5724 50/15 W peak/avg. transmitter
5725 100/25W peak/avg. transmitter
5726 160/50 W peak/avg. transmitter
5727 280/100 W peak/avg. transmitter

Options

NTSC/PAL modulator module for analog applications
LPN oscillator module for digital applications
Internal reference oscillator
5040 VHF/UHF Receiver

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Front Panel

The front panel of the 5720 is hinged for easy access to the modules inside. Two latches secure the panel shut. When opened, the panel provides easy access to the modules inside the unit. A liquid crystal display (LCD), displays pertinent details about the transmitter as detailed below. Various screens and functions are accessible through use of the five soft touch keys below the LCD. Two LED's indicate operating status of the unit.

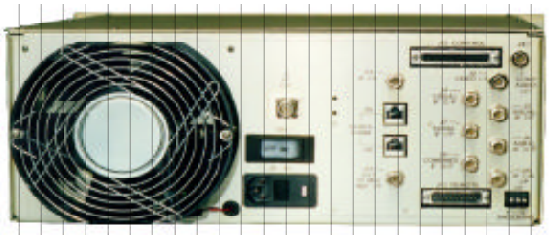
5720 Messages

Message Description	English Message	Spanish Message	Portguese Message
software version 2.5	V2.5	V2.5	V2.5
Axcera, LLC	Axcera, LLC	Axcera, LLC	Axcera, LLC
Lawrence, PA, USA (724) 873-8100	Lawrence, PA, USA (724) 873-8100	Lawrence, PA, USA (724) 873-8100	Lawrence, PA, USA (724) 873-8100
model:	MODEL	MODELO	MODELO
RF channel	RF CHANNEL	CANAL RF	CANAL RF
version 1.0	VERSION 1.0	VERSION 1.0	VERSÃO 1.0
scada address	SCADA ADDRESS	DIRECCION SCADA	DESTINO SCADA
output power %	OUTPUT PWR %	POTENICA%	POT.SAIDA%
external amplifier AMP%	EXT OUT PWR %	POT.AMP.EXT.%	P SAIDA
output power %			
reflected power %	RFL PWR %	POT.RFL%	POT.RFL%
external amplifier reflected power %	EXT RFL PWR %	POT RFL EXT%	POT RFL EXT%
standby	STB	ESPERA	ESPERA
operate	OPR	OPERANDO	
LIGADO			
status previous next	STS PRV NXT	EST PRV PROX	SITUACAO PREV PROX
system previous next	SYS PRV NXT	SIS PRV PROX	SIS PRV PROX
previous next	PRV NXT	PRV PROX	ANT PROX
transmitter status	TRANSMITTER STATUS	ESTADO DEL TX	SITUACAO TRANSMISSOR
alc voltage: V	ALC VOLTAGE: V	VOLTAGE ALC:V	VOLTAGE ALC:V
afc voltage: V	AFC VOLTAGE: V	VOLTAGE AFC:V	VOLTAGE AFC:V
IF present	IF PRESENT	IF PRESENTE	PRESENCA DE FI
IF input fault	IF INPUT FAULT	FALLA IF	FALHA ENT IF

output power OK	OUTPUT POWER OK	POTENCIA OK	POT SAIDA OK
output power fault	OUTPUT POWER FAULT	FALLA POTENCIA	FALHA POT SAIDA
PLL locked		PLL LOCKED	PLL CERRADO PLL ENGATADO
PLL fault		PLL FAULT	FALLA PLL
power supply OK	POWER SUPPLY OK	FUENTE ALI CONFORME	FONTE DE ALI OK
power supply fault	POWER SUPPLY FAULT	FALLA FUENTE ALI	FONTE DE ALI FALHA
external amplifier moduleOK	EXT. AMP. MODULE OK	MOD AMP EXT OK	MODULO AMP EXT OK
external amplifier module fault	EXT AMP MODULE FAULT	FALLA AMP MOD EXT	FALHA MODULO AMP EXT
external amplifier temperature OK	EXT AMP TEMP OK	TEMP AMP EXT OK	TEMP AMP EXT OK
external amplifier temperature fault	EXT AMP TEMP FAULT	FALLA TEMP EXT AMP	FALHA TEMP AMP EXT
external power supply OK	EXT PWR SUPPLY OK	FUEN ALI EXT OK	FONTE ALI EXT OK
external power supply fault	EXT PWR SUPPLY FAULT	FALLA FUEN ALI EXT	FALHA FONTE ALI EXT
modulator PLL locked	MODULATR PLL LOCKED	PLL MOD CERRADO	MODULO PLL ENGATO
modulator PLL fault	MODULATR PLL FAULT	FALLA PLL MOD	MODULO PLL FALHO
modulator input OK	MODULATR INPUT OK	MOD OK	ENT MODULO OK
modulator input fault	MODULATR INPUT FAULT	FALLA MOD	ENT MODULO FALHA
model setup	MODEL SETUP	MODELLO PROGRAM	SETUP MODELLO
RF channel setup	RF CHANNEL SETUP	CANAL RF PROGRAM	SETUP CANAL DE RF
scada address setup	SCADA ADDRESS SETUP	SCADA LOC PROGRAM	SETUP DESTINO SCADA
output power fault setpoint	OUT PWR FLT SETPOINT	AJUSTE ALAMA POT	AJUST FALHA PO SAIDA
power %	POWER: %	POT:%	POT:%
peak vs average OK	PEAK VS AVG OK	PICO/PROMEDIO OK	PICO VS MEDIA OK
peak vs average fault	PEAK VS AVG FAULT	FALLA PICO/PROMEDIO	PICO VS MEDIA FALHA
modulator video present	MODULATR VIDEO PRSNT	VIDEO MOD PRESENTE	PRESENCA VIDEO MOD
modulator video loss	MODULATR VIDEO LOSS	PERDIDA DE VIDEO MOD	PERDA VIDEO MODULAT
region setup	REGION SETUP	REGION PRPGRM	ADJUSTE DE REGIÃO
region:	REGION:	REGION:	REGIÃO
0 % 120	0 % 120	0 % 120	0 % 120

Rear Panel

The rear panel of the 5720 features remote control inputs and outputs, visual and aural IF inputs and outputs, visual and aural analog inputs, 10MHz reference input, and access to SCADA communications if that is a selected option. AC connections as well as a cooling fan and circuit breaker are also located on the back of the unit as pictured below.



Connection	Label	Description	Connector Type / Impedance	Frequency
J1	AC	AC input to the unit	IEC320	50 or 60 Hz
J2	Video I/P	Video Signal Input	BNC 75 ohms	baseband
J3	Comp Audio I/P	Composite audio input	BNC 75 ohms	50Hz-100KHz
J4	Visual IF O/P	Visual IF signal output	BNC 75 ohms	38.9-45.75 MHz analog 36 or 44 MHz digital
J5	Visual IF I/P	Visual IF signal input	BNC 75 ohms	38.9-45.75 MHz analog 36 or 44 MHz digital
J6	Aural IF O/P	Aural IF signal output	BNC 75 ohms	38.9-45.75 MHz analog 36 or 44 MHz digital
J7	Aural IF I/P	Aural IF signal input	BNC 75 ohms	38.9-45.75 MHz analog 36 or 44 MHz digital
J8	RF O/P	RF signal output	N / 50 ohms	2.1-2.7 GHz
J9	Combined IF O/P	Combined IF output	BNC 75 ohms	38.9-45.75 MHz analog 36 or 44 MHz digital
J10	IF CW I/P	IF contionious wave input	BNC 75 ohms	38.9-45.75 MHz analog 36 or 44 MHz digital
J11	Baseband	Baseband audio input	3 position terminal block	baseband 600 ohms
J12	Control	Control Signals	D connector 37 position female	N/A
J13	Remote	Remote signals	D connector 25 position male	N/A
J14	IF I/P	IF input signal	BNC / 75 ohms	38.9-45.75 MHz analog 36 or 44 MHz digital
J15	SCADA Comm	SCADA port	RJ-45	N/A
J16	SCADA Comm	SCADA port	RJ-45	N/A
J17	EXT 10MHz Ref I/P	10 MHz reference input	BNC / 50 ohms	10 MHz
CB1	AC	Circuit breaker	N/A	N/A

Connections for an External Amplifier

(from amplifier) J3 D Connector	Description	(to transmitter) J12-D Connector
J3-4	Remote forward power	J12-35
J3-6	Remote reflected power	J12-37
J3-8	Operate	J12-13
J3-5	Ground (typical)	J12-36
J3-9	Amplifier interlock return	J12-18
J3-10	Amplifier interlock for ABS (if used)	
J3-16	Remote overtemperature	J12-33
J3-18	Amplifier fault	J12-24
J3-25	Ground (typical)	J12-30
J3-20	Power Supply Fault	J12-26
J3-24	Encoding gating pulse	J12-17

Rear Panel Loop Thrus

Two rear panel loop thrus are located on the back of the transmitter. The Visual IF O/P J4 is connected to the Visual IF Input J5, and the Aural IF Input J7 is connected to the Aural IF input J6 if no scrambling or encoding is used.

Connections For Scientific Atlanta Scrambling

1. Connect baseband video output of the SA scrambler to J2 (video input) of the transmitter.
2. Connect visual IF output J4 of the transmitter to visual IF input of the SA scrambler.
3. Connect visual IF input J5 of the transmitter to visual IF output of the SA scrambler.
4. Connect aural IF output J6 of the transmitter to aural IF input of the SA scrambler.
5. Connect aural IF input J7 of the transmitter to aural IF output of the SA scrambler.
6. Connect “D” connector J12 of the transmitter to pulse output of the SA scrambler.

5700 Series Transmitter Connections For Pac-Mono (Cypeherpoint) Scrambling

Data Channel Data Encoder

-Wire the data channel audio source to the data encoder rear panel AUDIO INPUT J7.
-Connect the DATA/AUDIO OUT to the transmitters composite audio input J3.
-Connect the data channel video source to the video input J2 of the data channels transmitter.

Non-Data Channels

-Connect video source to the Video Processor In connector and the matching Video Processor Out connector to J2 Video Input of transmitter.

Gating Pulse
The gating pulse can be connected two different ways

-If Axcera supplied the buffer/amplifier assembly and harness, then you connect the data encoder J6, Vertical Clamp Pulse Out, to the BNC connector on the buffer.

-Wire each terminal block and harness into each rack and make connections to D connectorJ12 pins 16 and 17 on each transmitter.

-Connect buffer terminal block to each terminal block in each rack so that all transmitters are wired in parallel.

Or.....

-The other option is to daisy-chain the encoder pulse out with BNC tees and to all transmitters.

Pac-Mono Scrambling Setup

Note: This procedure should not be performed until the hardware connections for both video and Gating pulse have been completed. Please refer to the Pac-mono setup above.

Refer to Fig. 1 for an example of a normal unscrambled “five step” video as viewed on a Spectrum Analyzer in Zero Span looking at the output of the transmitter.

Figure 1

Notice the top line is Peak-of-Sync and two centimeters down from the top line is Blanking. Also, one centimeter up from the bottom line is “White”. These three points will be referred to later in this procedure.

To obtain this pattern it is necessary to first setup the Pac-Mono equipment per their procedure.

Connect the “five step” video from the signal generator to the **input** of the Pac-mono card. The output of the Pac-Mono equipment is then connected to the **video input** of the ADC transmitter.

Verify the transmitter is in the **Auto-Clamp** mode by moving the **Manual / Auto Clamp** switch found on the **Modulator Module** to the right. The scrambling equipment should be in the Normal or Unscrambled mode.

With the transmitter in Operate, adjust the Depth of Modulation **slightly** using the **Video Gain** control on the Modulator Module until the waveform looks similar to Fig. 1.

Note: Verify the Spectrum Analyzer has a Bandwidth setting of 1MHz to minimize the effects of any adjacent channels.

Verify the Manual Clamp mode is set correctly by moving the **Manual / Auto Clamp** switch found on the **Modulator Module** to the left and adjust the Manual Bias until the pattern is similar to Fig. 1.

Leave the **Manual / Auto Clamp** switch in the **Manual Mode**.

This completes the pre-adjustment of the transmitter with scrambling off.

Place the Pac-mono equipment into the **Scrambled Video Mode**. This will remove the Peak-of-Sync. line and move Blanking upward towards the top of the screen.

Locate the **Gate Level** adjustment control on the front of the Power Amplifier Module. Adjust the control **slightly** until the Blanking level moves back to its original position, two centimeters down from the top of the screen.

Change the signal on the video generator to **Zero IRE, No Burst**. This will reveal a line 3 centimeters down from Blanking. This is the Sync line in Scrambled Mode. Verify this line is 3 centimeters down. If not, adjust the manual clamp **slightly** to correct the offset.

Disconnect the Signal Generator and connect Live Video. While viewing the Live Video on the Spectrum Analyzer, verify the white levels are one centimeter up from the bottom of the screen. If they are not, adjust the video coming from the IRD or other video source. **Do not readjust the transmitter video gain. This will change the scrambled Sync level and cause picture problems.**

This completes the transmitter setup.

NOTE :Peak/Avg fault should be dissabled any time you are transmitting analog signals.....Enabled when transmitting digital (QAM)

Video present fault should be enabled only when there is NEVER going to be video encoding that envolves the removal of horiz and/or vertical sync at the baseband level. i.e. Any system that requires the clamp to be in manual mode should have the video present fault dissabled. This includes Pac mono and Cal Amp. By the way, the video fault sensing circuitry only works reliably in the clamp on mode.

OPERATION

Initial Turn On

Once all connections have been made and the unit has been installed, the process of turning on the equipment can begin. First verify that AC power is present and connected to each transmitter. Verify all cables are properly connected and the correct type. Once all of these things are done, the unit is ready to be turned on following the procedures below.

Turn on the main AC power source that supplies the entire system. Turn on the AC circuit breaker (CB1) on the back of each unit.

```
AXCERA                    V 2.5
LLC
```

Verify that each unit is showing the display as indicated in the diagram. (Note: Some models may display ADC TELECOMMUNICATIONS).

```
MODEL: 5724
RF CHANNEL: A1

STB          STS     PRV
```

When the transmitter is in operate mode, the STB menu appears. In standby mode, the OPR menu appears. Press the NXT key after each menu to continue through the sequence that follows.

```
VERSION 2.5
SCADA ADDRESS: 32

STB          STS     PRV
```

If the SCADA option is selected, the unit will display the version number and SCADA address.

```
OUTPUT PWR 75%
0            50          100
STB          STS     PRV
```

Next, the unit will display percentage output power.

```
REFLECTED PWR 10%
0            50          100
STB          STS     PRV
```

Percentage reflected power screen.

```
EXT OUTPUT PWR 75%
0            50          100
STB          STS     PRV
```

External amplifier output power (if external amp present)

Status Screens

Normal Operation

```
TRANSMITTER STATUS
IF PRESENT

STB          SYS    PRV   NXT
```

or

Fault Condition (flashing)

```
TRANSMITTER STATUS
IF INPUT FAULT

STB          SYS    PRV   NXT
```

Additional messages are as follows:

IF PRESENT	IF INPUT FAULT
OUTPUT POWER OK	OUTPUT POWER FAULT
PLL LOCKED	PLL FAULT
EXT REF PRESENT	EXT REF FAULT
AMP MODULE OK	AMP MODULE FAULT
TEMP OK	TEMP FAULT
PWR SUPPLY OK	POWER SUPPLY FAULT
PEAK VS AVG OK	PK VS AVG FAULT

If an external amplifier is present:

EXT AMP MODULE OK	EXT AMP MODULE FAULT
EXT AMP TEMP OK	EXT AMP TEMP FAULT
EXT PWR SUPPLY OK	EXT PWR SUPPLY FAULT

If a modulator is present:

MODULATOR VIDEO PRSNT	MODULATOR VIDEO LOSS
MODULATOR PLL LOCKED	MODULATOR PLL FAULT
MODULATOR INPUT OK	MODULATOR INPUT FAULT

Setup Screens

```
TRANSMITTER STATUS
IF INPUT FAULT

STB          SYS    PRV   NXT
```

Accessing the setup screens is accomplished by holding down the second button for five seconds.

```
MODEL SETUP
MODEL :5722

INC    DEC          PRV   NXT
```

The 5720 series transmitter provides the user with various setup options. First select the appropriate model. (5722, 5723, 5724, 5725, 5726, 5727)

```
REGION SETUP
REGION: 2

INC    DEC          PRV   NXT
```

Select the proper region as follows:
Region 0 = United States
Region 1 = South America

```
RF CHANNEL SETUP
RF CHANNEL: A1

INC    DEC          PRV   NXT
```

RF channel setup menu.

```
SCADA ADDRESS SETUP
SCADA  ADDRESS: 32

INC    DEC          PRV   NXT
```

SCADA setup menu.

```
FWD PWR FLT SETPOINT
POWER = 28%

INC    DEC          PRV   NXT
```

Forward power fault setpoint menu

```
                    STS
```

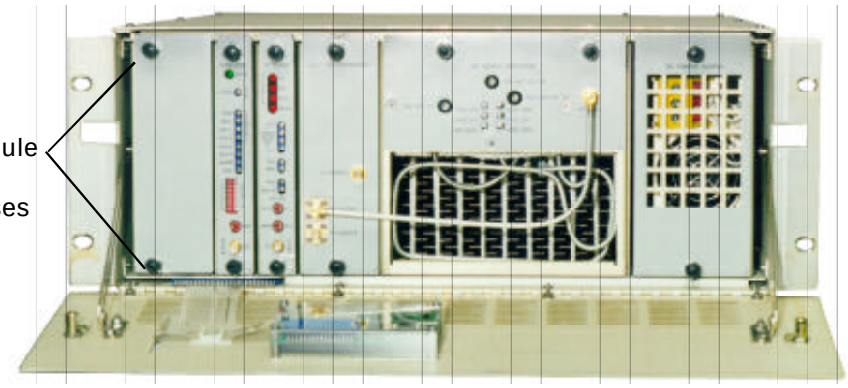
To return to the status menu, press the STS key.

MODULES

Module Replacement

Module replacement on 5720 series products is a relatively simple process. All modules plug directly into the backplane board except the power supply and power amplifier module which plug into a blind mating connector. A detailed description of how to replace each module is addressed in the section to follow.

Turn the grip lock connectors on the module counterclockwise until the module releases

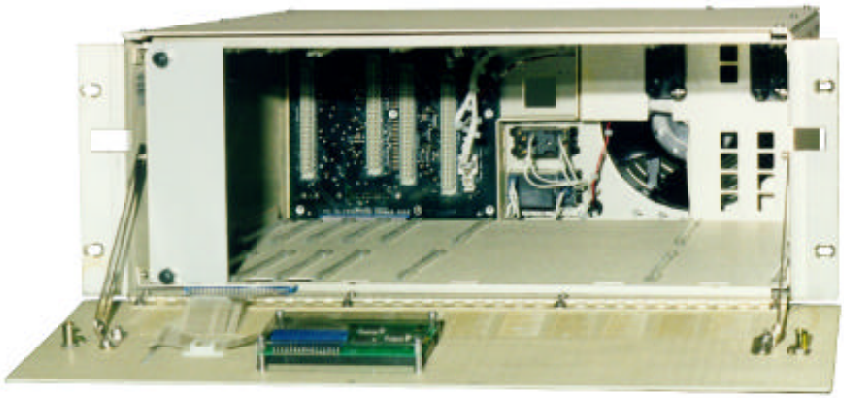


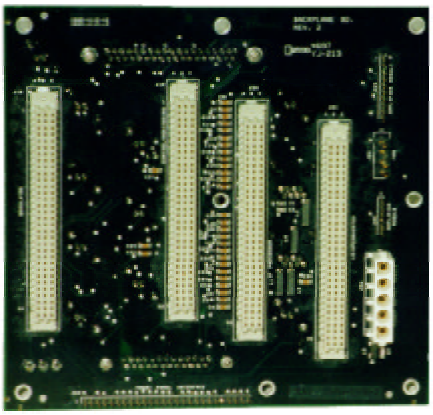
Gently pull the module from the unit. Slide the new module in place and make certain it connects to the backplane board. If the new module does not slide in easily, verify it is properly aligned in the nylon tracks

Note: Modules have assigned slots and will not fit properly in the incorrect slot. Each module has a number on the front (1-6) that corresponds to its correct placement. Modules are placed in the unit in numerical order from left to right.

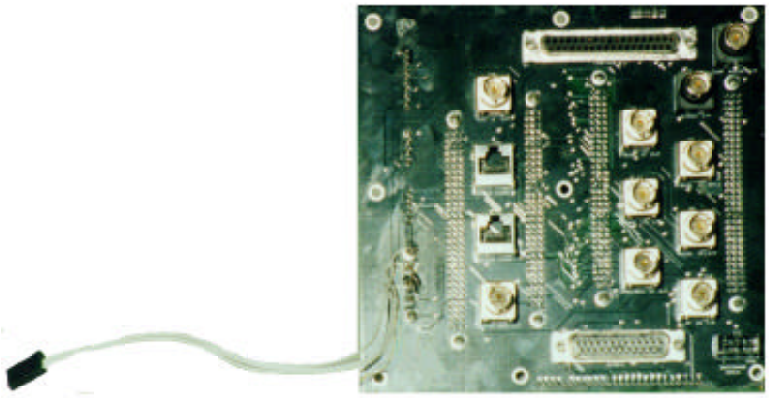
Backplane Board

The backplane assembly provides module to module connection with devices being directly plugged in. Connections on the backplane also interface with other devices to establish remote control and command functions. The schematic on the next page shows connections from the backplane board the rest of the backplane system.

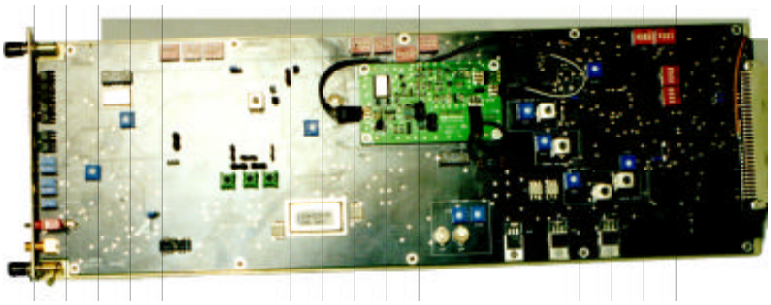




front and rear view of the backplane board.



Modulator Module



The modulator can be used with an external 4.5MHz aural input instead of the normal bal anced and composite inputs. The 4.5 MHz is applied to the transmitter using the composite audio input connector. There are three jumpers on the modulator module that will need to be moved to convert to this input.

Conversion procedure:
Remove modulator module. Move the jumper on J4 so that it connects pins 1 and 2. Move the jumper on J6 so that it connects pins 1 and 2. Move the jumper on J5 so that it connects pins 2 and 3.

Install modulator module. Apply 4.5 MHz signal to rear of tray to the composite audio input. This level should be between -14 and -10 dBm. Adjust the “A IF” potentiometer on the modula tor for the desired A/V ratio for the transmitter.

A/V ratio adjustment:
Adjust the Aural Level potentiometer for the desired A/V ratio for the system.

Fault Indicators:
A PLL: This illuminates when the Aural IF PLL is unlocked.
IF PLL: This illuminates when the IF PLL unlocks.
A MOD: This indicator will illuminate when the audio overdeviates the aural carrier.
V I/P: This indicates the loss of Video to the modulator
V MOD: This illuminates when the video is overmodulated.

Status Indicators:
EXT IF CW: This indicates that there is an external IF CW signal applied to the modulator10MHz: This indicates the presence of the 10 MHz reference.

Dip Switch Settings

The switch settings on the modulator board for an NTSC system are as follows:

Visual Carrier

IF	Channel Freq	SW2	SW9	SW10	SW12	SW8	SW6	SW7
45.75	CF	1100	0111	0001	0001	0111	1111	1000
45.75 +10KHz	CF -10KHz	1100	0111	0001	0001	1111	0000	0000
45.75 -10KHz	CF +10KHz	1100	0111	0001	0001	0111	1111	0000
38.9	CF	1100	0100	0000	0110	1000	0100	0000
38.9 + 1/2 line	CF -1/2 line	1100	0100	0000	0110	1000	0100	0101
38.9 - 1/2 line	CF +1/2 line	1100	0100	0000	0110	1000	0011	1011
38.9 +1/3 line	CF -1/3 line	0010	1101	0000	1001	1000	1110	0101
38.9 - 1/3 line	CF + 1/3 line	0010	1101	0000	1001	1000	1101	1011
38.9 +2/3 line	CF -2/3 line	0010	1101	0000	1001	1000	1110	1010
38.9 -2/3 line	CF +2/3 line	0010	1101	0000	1001	1000	1101	0110

Aural Carrier

Inter Carrier	IF	SW3	SW4	SW5	SW11
4.5 MHz	45.75 and 45.75 +/- 10 KHz	0000	0111	1000	0000
5.5 MHz	45.75 and 45.75 +/- 10 KHz	1000	1000	1100	0000
	38.9 and 38.9 +/- 1/2 line	0000	1011	0011	0000
	38.9 +/- 1/3 line and 38.9 +/- 2/3 line	1000	0010	0101	0000
6.0 MHz	45.75 and 45.75 +/- 10 KHz	1000	0100	0011	0000
	38.9 and 38.9 +/- 1/2 line	0000	1111	0001	0000
	38.9 +/- 1/3 line and 38.9 +/- 2/3 line	1000	0110	0001	0000
6.5 MHz	45.75 and 45.75 +/- 10 KHz	1000	0010	1010	0000
	38.9 and 38.9 +/- 1/2 line	1000	0000	0010	0000
	38.9 +/- 1/3 line and 38.9 +/- 2/3 line	1000	0001	0110	0000

1 = switch off with IC input at 5V
0 = switch on with IC input shorted to ground

Audio Jumpers for Modulator Module

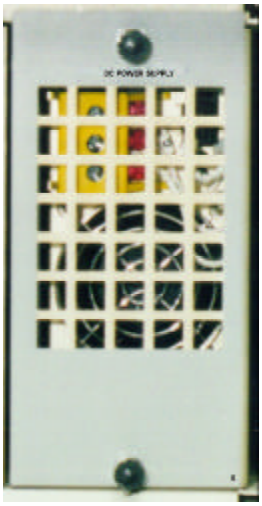
J2	Preemphasis enable	1,2
J4	Floating / Grounded composite (gnd enabled)	1,2
J5	4.5 MHz subcarrier int/ext (internal enabled)	1,2
J6	Ext 4.5 MHz subcarrier enabled	1,2

Video Jumpers

J9	Group delay enable	2,3
J11	Video loss fault enable	1,2

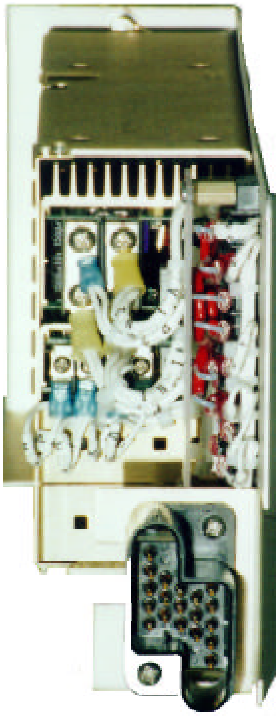
Power Supply Module

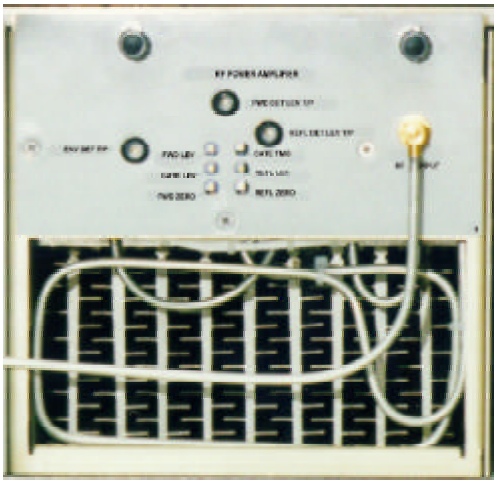
The power supply module contains a 530 watt switching power supply and an eight position terminal block. It is configured for three output voltages +12V, -12V, and a main output power of 10.8V. The supply is power factor corrected to .98 for optimum efficiency and decrease in energy consumption. For safety purposes all outputs are over voltage and over current protected. This supply will also accept input voltages from 85 to 264 volts AC, but the power entry module must be switched to the proper input voltage setting. The terminal block within the power supply module is protected by metal oxide varistors which protect and prolong the life of the power supply by providing surge protection. Below is a list of the connections on J1 which interface with other devices.



J1-1	J3-1 Power Amplifier Assembly	+10.8 Volt Supply
J1-2	J3-2 Power Amplifier Assembly	+10.8 Volt Supply
J1-3	J3-3 Power Amplifier Assembly	+10.8 Volt Supply
J1-4	J3-4 Power Amplifier Assembly	+10.8 Volt Supply
J1-5	J3-5 Power Amplifier Assembly	+10.8 Volt Supply
J1-6	J3-6 Power Amplifier Assembly	Return
J1-7	J3-7 Power Amplifier Assembly	Return
J1-8	J3-8 Power Amplifier Assembly	Return
J1-9	J3-9 Power Amplifier Assembly	Return
J1-10	J4-2 Backplane Board	+12 Volts
J1-11	J4-3 Backplane Board	Return
J1-12	J4-1 Backplane Board	-12 Volts
J1-13	J4-4 Backplane Board	Enable
J1-14	J4-5 Backplane Board	Power Supply DC OK (logic low = DC OK)
J1-15	CB1 Circuit Breaker	Line Voltage
J1-16	B Power Entry Module	MOV
J1-17	C Power Entry Module	MOV
J1-18	CB1 Circuit Breaker	Neutral Line
J1-19	Chassis Ground	Ground

Back view of the Power Supply Module



Power Amplifier Module

The power amplifier module has a female SMA RF input connector on the front of the mod ule. The RF I/P signal applied to this connector is amplified and transmitted from the back of the module through a female N connector. There are several power configurations avail able with or without feed forward linearization. Power level ratings vary depending on the type of modulation used. In systems using QAM, power is rated in terms of average power. In systems using analog video modulation power is rated in terms of peak synch power. Typically, peak output power levels in systems using QAM can reach 4 times the average power. For 64 and 256 QAM, this 6dB back-off is required to assure both a quasi error free bit error rate with forward error correction and a spectral regrowth low enough to prevent adjacent channel interference. The amplifier also has a Peak Envelope Power (PEP) rating. PEP represents the maximum peak amplitude power that the carrier can attain without experiencing significant nonlinear distortion from the amplifier. The various power configurations are summarized in the table on the following page.