ADC Telecommunications

TECHNICAL MANUAL
EXHIBIT II

(PRELIMINARY)

ITS-605C

BROADBAND BOOSTER

REV: 0

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SYSTEM DESCRIPTION

The ITS-605C Boradband Booster is a wideband linear amplifier intended to be used as a booster in the MMDS/ITFS frequency bands, from 2500.00 to 2569.00 MHz, which allows the unit to operate with up to thirty one 6 MHz channels. The power capability of the unit varies with the number of channels according to specifications. The 605C is packaged in a weatherproof aluminum outdoor enclosure and uses an external convection cooled design.

The 605C includes a preamplifier, power supply, and mounting hardware. . A multi-channel RF input signal enters the system at the broadband booster tray's RF input where it is filtered and amplified. The broadband booster tray also incorporates automatic level control to maintain the combined output power within the limits of the output amplifiers and all the necessary control logic of the system.

SPECIFICATIONS: ITS-605C Broadband Booster

Type of Emissions ..... BOOSTER
Frequency Range ..... 2500 to 2569 MHz
DC voltage and total current of final amplifier stage ..... 10 volts DC at 5.48 amps
(Class A - Not RF power dependent)
Output Power Rating ..... 1.5 watts (peak envelope)
(250 mW total average)

Performance Specifications

Operating Frequency Range ..... 2500 to 2569 MHz
RF Output - Nominal:
Impedance ..... 50 Ω
Connector ..... Type N

Power (average):
4 Channel ..... 62.5 mW/channel
8 Channels ..... 31.25 mW/channel
12 Channel ..... 20.8 mW/channel
16 Channels ..... 15.6 mW/channel
24 Channel ..... 10.4 mW/channel
31 Channels ..... 8.0 mW/channel

Nominal Input Signal Range ..... -83 to -53 dBm/channel
Connector ..... Type N
Impeadance ..... 50 Ω

Out-of-Band Power ..... Per FCC Rules (21.908)
-25 dB max (at band edges):
-40 dB max (250.00 KHz above and 250.00 KHz below band edges):
-50 dB max (3.00 MHz above and 3.00 MHz below band edges):
-60 dB max (20.00 MHz above and 20.00 MHz below band edges):

Out-of-Band Power (Unoccupied Channel) ..... -25 dB max (at unoccupied channel edges)
-40 dB max (250.0 KHz above and 250.0 KHz below occupied channel edges):
-50 dB max (3.0 MHz above and 3.0 MHz below occupied channel edges):

Harmonic Products ..... -60 dB max

Electrical Requirements

Power Line Voltage ..... 60VAC, ±10%, 50/60 Hz
Power Consumption ..... 260 Watts

SPECIFICATIONS: ITS-605C Broadband Booster

Environmental

Maximum Altitude ..... 12,000 feet (3,660m)
Ambient Temperature ..... -40° to 50°C

Mechanical

Dimensions: (WxDxH)
Broadband Booster Tray .....18" x 21" x 11.5" (45.75cm x 53.33cm x 29.25cm)
Weight:
Broadband Booster Tray ..... 60 lbs. (27.3 kgs)

INSTALLATION PROCEDURE

Unpacking

Please inspect all material thoroughly upon arival. ADC certifies that upon leaving our facility the equipment was undamaged and in proper working order. The shipping container should be inspected for obvious damage indicative of rough handling.

Remove the booster from the shipping container and inspect for damage. Check for dents, and scratches, or any broken connectors. Extract all packing material from inside and around the unit. Check for loose hardware and connectors, retighten if needed. Any claims against in-transit damage should be directed towards the carrier. Save all packing material in case unit must be returned.

Installation of Booster

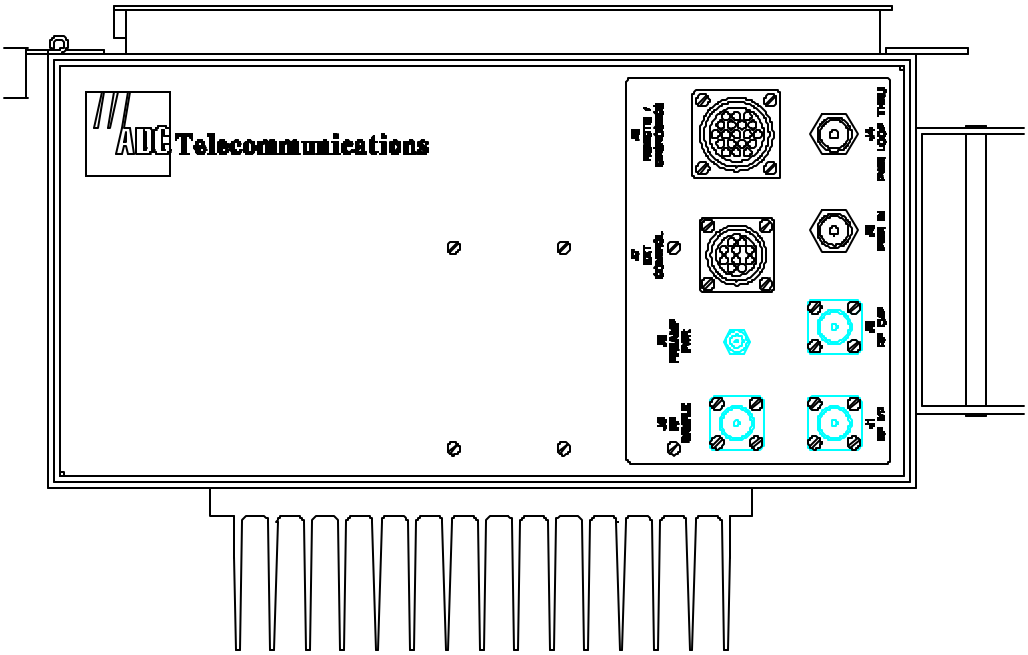
The 605C is designed as a pole mount device, however, it may also be mounted on the side of a building or most any other desired location. For pole mount applications, an Installation Material Kit including a mounting bracket, U-bolts, and other necessary hardware is provided.

Location of the receive antenna in respect to the transmit antenna is critical. Every situation is unique, therefore it is necessary for system design to be considered. If the system is configured such that both antennas are on the same tower, then vertical separation is necessary. The distance will depend on the antennas being used and their location, transmit on top receive on bottom or vise versa. For other configurations, typically some type of shielding is used. Consult with your system designer for specific details pertaining to your site.

After the unit is physically in place, the process of interfacing them into the system begins by making connections to the bottom of the booster.

CONNECTIONS

Cable selection is a very critical part of the installation. Several optional power kits are available from ADC. In the event cables are purchased from another supplier, pliase consult with your system designer prior to purchase. Use of incorrect cables may result in substantial signal loss or cause interference to other devices. Also, pay close attention to loss on cables that are substantial in length. This could have a major impact ot circuit behavior.



RF I/P (J1)	Provides an RF input to the unit
RF O/P (J2)	Provides an RF output from the unit
PWR IN (J3)	Power in to the Unit
PWR LOOP THRU (J4)	Power outlet used to supply secondary units
RF SAMPLE (J5)	Provides an RF sample from the unit
PRE AMP PWR (J6)	Provides DC voltage to the preamp
EXT CONTROL (J7)	For external switching from operate to standby
REMOTE DIAGNOSTICS (J8)	Provides remote monitoring ability

INITIAL TURN ON

Prior to turning on the system, be sure all connections are in the correct place. Next, follow the steps outlined below:

1. Turn the external power supply on.

2. Verify green LED's DS1-DS4 on the ±12V/5±V Power Supply Board are illuminated.

3. If the optional remote operate/standby feature is not used, move J11 on the Booster Control Board to the OPR Lock position. If the feature is used, the jumper should be in the RMT OPR position.

4. Move switch S1 on the Booster Control Board to the operate position.

5. Check the position of switch SW2 on the Booster Control Board to verify it is in the ALC position.

6. The output power of the booster can be adjusted with R42 on the Booster Control Board.

INTERNAL LED INDICATORS 605C

ASSEMBLY NAME	LED	INDICATION
BIAS PROTECTION BOARD	DS1-GREEN	BIAS CURRENT
BOOSTER CONTROL BOARD	DS1-GREEN	THERMAL INTER.LOCK
BOOSTER CONTROL BOARD	DS2-GREEN	OPERATE
BOOSTER CONTROL BOARD	DS3-RED	OVERDRIVE
BOOSTER CONTROL BOARD	DS4-RED	LOW OUTPUT
±12V/±5V POWER SUPPLY BOARD	DS1-GREEN	PROPER VOLTAGE FROM REGULATOR
±12V/±5V POWER SUPPLY BOARD	DS2-GREEN	PROPER VOLTAGE FROM REGULATOR
±12V/±5V POWER SUPPLY BOARD	DS3-GREEN	PROPER VOLTAGE FROM REGULATOR
±12V/±5V POWER SUPPLY BOARD	DS4-GREEN	PROPER VOLTAGE FROM REGULATOR

NOTE: - ALL GREEN LEDs SHOULD BE ILLUMINATED WHEN THE BOOSTER IS OPERATING. RED LEDs SHOULD NOT BE ON AT ANY TIME.

MAINTENANCE AND TROUBLESHOOTING

Problem Identification

The boster consists of several amplifier modules and supporting circuitry. If the driver stages are not at fault, first note the symptoms of the problem that is present. Most amplifier faults relate to low or no output power and/or signal quality problems. If there is no output power from the amplifier, first check to determine if the amplifier is being supplied the proper AC and control input commands. If the amplifier is operating but producing no output, check all of the LED indicators inside of the amplifier to determine if any of the green LEDs are not lit. If a green LED is found not lit, the troubled section of the system is most likely to be in that area. If all DC and control functions seem normal, it is necessary to quantify the performance problem and then determine the possible causes. **If an effort is being made to contact the factory to assist in problem identification, please record the status of all indicators, meter readings and signal quality measurements so that these important parameters may be related to the factory.**

Problem Analysis

In most cases, the performance of a GaAsFET transistor is closely tied to the DC operation of the system. Any degradation in signal quality, gain or power is usually related to a corresponding change in a DC parameter somewhere in the system. An exception may be a defective RF input or output connection which can result in poor performance of the amplifier with all DC parameters appearing normal.

The first step of analysis is therefore to carefully measure all DC parameters and compare these to the numbers indicated on the schematics, block diagrams, and factory test data sheet.

If all DC parameters are normal, an RF intermittency should be suspected. Follow the RF path from input to output and apply a small physical force on all connectors while observing the output power. If an intermittency is detected, a simple resoldering can be attempted.

While following these procedures, it is important to maintain terminations on all amplifier circuits to avoid VSWR damage. Before a fan fails, it normally begins to exhibit noisy operation. Always check for free fan blade movement and procure a replacement fan if fan bearing noise is evident.

Repair Procedures

Repair of this translator assembly normally involves module level replacement. ADC Telecommunications maintains an adequate stock of replacement modules. If you have determined that a particular subassembly is defective and that it cannot be easily repaired at your facility, please contact the ADC Costumer Services Department. An effort will be made to provide a module on an exchange basis. It is often possible to ship replacement modules counter-to-counter or one-day UPS/Federal Express to expedite delivery.
On some occasions it is necessary to perform component level repairs. In many cases failures can be a result of poor connections somewhere in the system. Poor connections can generally be repaired with a suitable, small, grounded soldering iron. A spare parts kit of standard components is available for this translator. Please contact the ADC Marketing Department for the price and availability of the spare parts kit. Individual components can also be ordered from the Customer Services or Marketing departments of ADC. The fuses are standard and generally available at local parts distributors. The parts list provides complete manufacturer's information and part number for all standard electrical components. These components can often be obtained from local distributors. An effort has been made to select standard (off-the-shelf) components whenever possible in the product design. Replacement of the GaAsFET transistors in the field is not recommended unless performed by an experienced technician. It is important to realize that each GaAs FET operates at a specific bias voltage that must be preset before the main power supply is switched on. Failure to provide the proper bias voltage will result in rapid GaAsFET destruction. Please refer to the ADC Warranty and Material Return Authorization procedures for additional information concerning repair parts.

Periodic Procedures

This translator is designed with components that require no periodic maintenance except for cleaning and record keeping.

The amount of cleaning necessary depends greatly on the conditions in the translator room. While the electronics have been designed to function well even if covered with dust, heavy buildups of dirt and insects will impede the effectiveness of the cooling and lead to shutdown or premature failure.

When it is apparent that the front panel is becoming dust covered, the top cover should be opened and the accumulated foreign material removed. A small, soft brush used in conjunction with a plastic wand-like attachment on a small vacuum cleaner is an excellent way to remove dirt. Alcohol and other cleaning agents should not be used unless you are certain that the solvents will not damage components or markings. Water based cleaners can be used if only a small amount of moisture is used. The fans or heat sinks should be carefully cleaned.

Occasionally check that all RF connections are secure, but be careful not to overtighten.

Data should be recorded for all meter readings on a regular basis. It is suggested that data be recorded once each month and that it be retained in a rugged folder or envelope for the life of the equipment. A sample format of a log sheet is included at the end of this section. Photocopies of this sheet may be used for if desired.

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BROADBAND BOOSTER

BROADBAND BOOSTER TRAY
DRAWING LIST (SUBASSEMBLIES)

Note: The following schematic can be found in the Schematics attachment.

Input Protection Board 1517-1102
Schematic 1517-3102

Average Power detector/Buffer Board 1517-1104
Schematic 1517-3104

DC/DC Converter Board 1517-1111
Schematic 1517-3111

Booster Control Board 1576-1101
Schematic 1576-3101

-5V/±12VDC Power Supply Board 1576-1102
Schematic 1576-3102

Three Stage Amplifier Module 1576-1107
Schematic 1516-3107

2 Section Bias Protection Board 1576-1114
Schematic 1576-3114

Single Stage 10W Amplifier Module 1576-1116
Schematic 1576-3116

Two Stage Bias Daughter Board 1576-1124
Schematic 1576-3124

Two Stage Amplifier Module 1576-1125
Schematic 1576-3125

Single Stage Amplifier Module 1576-1127
Schematic 1576-3127

PIN Attenuator Board 1576-1134
Schematic 1576-3134

Four Section Broadband Filter w/ Traps 2140-1033
Assembly Drawing 2140-5134