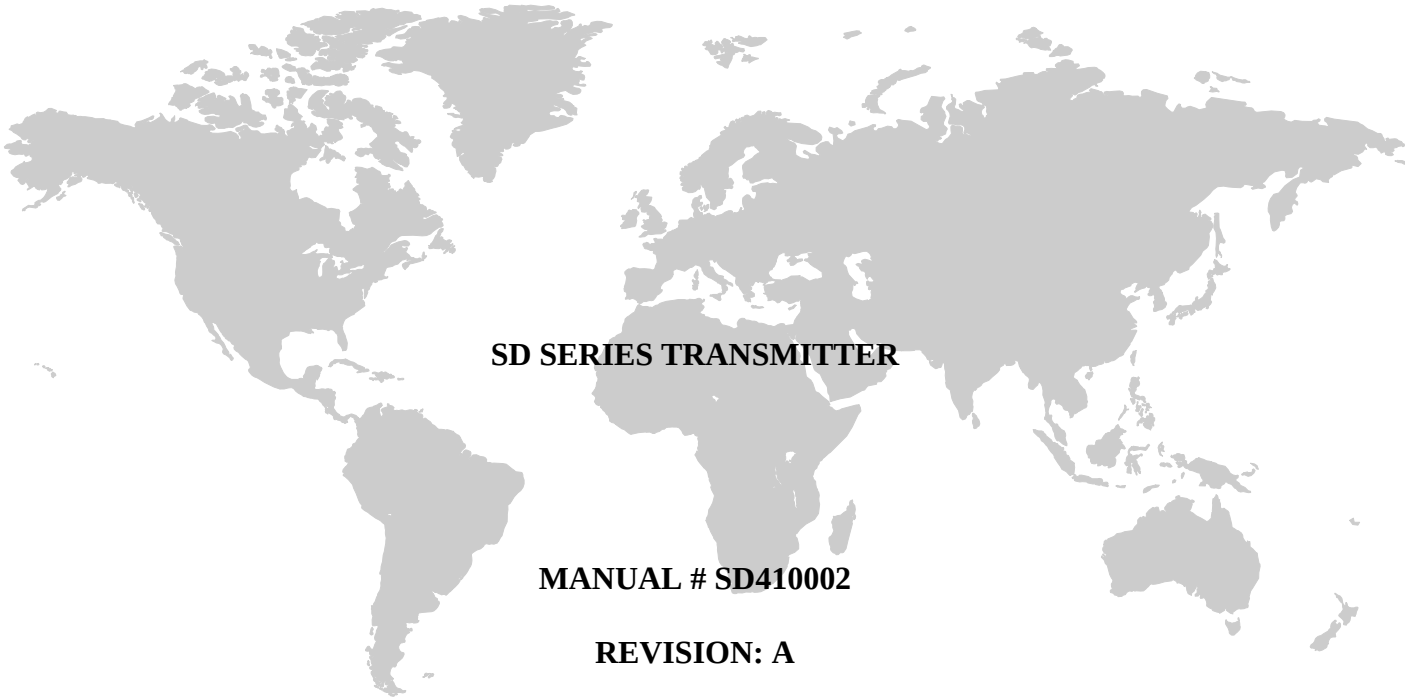


SOUTHERN AVIONICS COMPANY

MANUFACTURERS OF LOW FREQUENCY RADIOBEACONS AND ASSOCIATED PRODUCTS



SD SERIES TRANSMITTER

MANUAL # SD410002

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SOUTHERN AVIONICS COMPANY

MANUFACTURERS OF LOW FREQUENCY RADIOBEACONS AND ASSOCIATED PRODUCTS

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SOUTHERN AVIONICS COMPANY

MANUFACTURERS OF LOW FREQUENCY RADIOBEACONS AND ASSOCIATED PRODUCTS



REPAIR POLICY

Repair Rate: One Hundred Twenty (\$120) Dollars per hour plus Parts.

Minimum Repair Cost: One Hundred Twenty (\$120) Dollars.

Maximum Repair Cost: Seventy-five (75) percent of the price for a new or reconditioned item or its direct replacement. If an item sent to SAC for Repair is determined to be non-repairable and is replaced by a new or reconditioned item, the Customer is not charged for any costs incurred in time and materials spent in efforts to repair that particular non-repairable item. The Customer will only be charged the price of the replacement item. All non-repairable items are returned to the Customer. However if the Customer does not purchase a new or reconditioned item to replace that particular non-repairable item the Minimum Repair Cost is applied.

Turnaround Time: Southern Avionics Company's standard Turnaround Time is 45 days. Customers that request the Repair be processed in less than 45 days will be charged an Expediting Fee of Thirty (\$30) Dollars per hour in addition to the standard Repair Rate.

RMA (Return Material Authorization): Southern Avionics Company requires all items submitted to our factory for Repair must be accompanied by a Return Merchandise Authorization (RMA) Number. Please make a RMA request before returning items to Southern Avionics Company. This is the best way to communicate with us and ensure that your needs are taken care of. A RMA Number may be obtained by contacting *Angela Flores, Sales Administrator* either by telephone at 409-842-1717, extension 111 or by e-mail at angelaf@southernavionics.com.

Rejection: Southern Avionics Company reserves the right to refuse repair of any items that SAC deems to be non-repairable to our factory standards. Pads lifted from circuit boards or burnt circuit boards are examples of grounds for rejection.

Freight Costs: The Customer pays for freight costs to and from Southern Avionics Company. SAC will not be responsible for any loss or damage of any items in transit either to or from SAC.

Expiration of Support: SAC supports all items manufactured by SAC for no less than ten (10) years from date of original purchase. SAC will not repair any items that are older than ten (10) years old. Any items sent to SAC for repair that are more than ten (10) years old will be returned to the sender freight collect to the return address provided unless otherwise specified in writing prior to the receipt of the returned item by SAC.

Serial Numbers: Southern Avionics Company will not repair any items that are not accompanied by the Serial Numbers of the finished goods associated with the items.

Estimates: SAC will not provide any estimates of costs other than the costs outlined above.

Warranty: Repairs are guaranteed for 90 days after shipment. Warranty applies only to Repairs made and does not cover subsequent equipment failures not associated with the previous Repair.



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1 INTRODUCTION:

SD Series Introduction

The SD Series model beacon transmitters are computer controlled systems designed around the Motorola ColdFire® microprocessor. These systems are capable of remote monitoring and maintenance via several communication methods including RS232, RS 422, and RS485 protocols. An optional operator front panel offers the common user controls normally found on an analog transmitter. These panels may also be used for remote control. With the exception of main power application, all aspects of transmitter setup and operation come under the direct control of the Controller / Monitor. The following are all programmable:

- * Direct Digital Synthesis (DDS) of RF frequency and Audio Tone Frequency
- * Identifier Morse code dot, dash and space intervals.
- * Customer IDENT sequence
- * Standard Alarms
- * Additional Fault handling based on multipoint voltage, current and temperature monitoring
- * Transfer Criteria (Dual Only)
- * Power limits
- * Modulation limits

The Controller / Monitor itself can be controlled and monitored by another computer system connected locally via one of the hard wire protocols mentioned above or remotely using phone lines or any other carrier which can handle a standard US Robotics modem spectral output.

SDSeries General Theory of Operation



1.2 SPECIFICATIONS: SD Series Dual

General Description: SD25

This non-directional beacon is an Amplitude Modulated transmitter with an adjustable output power from 5 to 25 watts. The transmitter uses switching technology in the power amplifiers and modulator / regulator modules resulting in a highly efficient system, in a small package.

The exciter portion consists of an embedded 32-bit micro controller, an I/O interface circuit, an A/D converter, a monitor circuitry, and an optional voice processing circuitry in a single 3U enclosure. The controller has one "stored" non-volatile memory, redundant RF DDS (Direct Digital Synthesizer), redundant AF (Tone) DDS, and two serial ports (local and remote). Settings for ID mode, ID code, ID rate, sequence of operation and other parameters are set by an user interface program. Simple controls such as power adjustment, percent modulation, and side transfer are available locally for technical setup. Also for convenience, PA voltage, PA current, PA temperature, RF frequency, Tone frequency, Carrier power and percent modulation are displayed locally via 7-segment readouts. A simple switch disables remote control operation during local technical service.

The power portion of each transmitter consists of two independent 25 watts systems. Each system has an output filter, a switching power amplifier and switching modulator / regulator, power supply, and an optional battery supply.

The SD25 Dual consists of two independent SD25 transmitters and a Digitally Controlled Automatic Transfer unit housed in a single cabinet designed for outdoor use.

Transmitter: Model SD25

Qualifications: Meets applicable requirements of ICAO, FCC, FAA, Transport Canada, UK CAA, EC (emissions and safety standards).

Frequency Range: 190-1800 kHz, selectable in 500 Hz increments, stability better than .005% (-40(C to +70(C).

Power Output: Digitally generated carrier power into 50 ohms continuously adjustable 5 to 25 watts.

Spurious Emission: Radiated harmonics (measured at a dummy antenna) are more than 63 dB below the 25-watt carrier.

Type of Emission: NON, A2A, A3E (Optional), GID (with optional GPS beacon modulator), or any combination.

Modulation: Digital generated typically 400 or 1020 Hz.

Noise and Hum Level: More than 40 dB below the carrier level.

Input Power: 115/230V (15%, single phase 50-60 Hz. 24 VDC.

Efficiency: Better than 70% overall efficiency AC input to RF output at 25-watt carrier and tone keying at 95% modulation.

Numeric Digital Display Meters: Power output, reflected power, PA voltage, PA current, percent modulation, audio input level.

Keyer: Any combination of Morse code letters or numerals with any user set values pertaining to the length of dots and dashes, the time between them and the number of repetitions of the identification code per minute (character length dependent).

Circuit Protection: Open and short circuit proof and immune to damage that can be caused by improper antenna loads. Individual fuses are used to protect the AC and DC circuits and immune to severe damage caused by improper installation. VSWR circuit that shuts down the transmitter if VSWR exceeds an adjustable value. Over temperature and standby shutdown.

Working Conditions: Continuous unattended operation in the following environments: ambient temperature, -40(C to +70(C; relative humidity, 0-100%; high salinity as encountered in offshore conditions. IP66. Cooling by heat sinks with no fans.

Monitoring: Transmitter shuts down with loss of tone, drop in modulation below an adjustable value, or continuous tone, or when power falls below an adjustable value, or when VSWR rises above an adjustable value or when temperature rises above an adjustable value or in the event of a change in the code, its duration or rate. With a dual system, a shutdown signal initiates a transfer from the primary transmitter to the secondary transmitter.

Self-Diagnostics: Computer diagnostic routines that identify malfunctioning modules at LRU level available via local or remote PC. Transmitter and antenna coupler are suitable for installation and operation by untrained personnel.

Automatic Transfer Unit

Local Radiobeacon Control Panel (can be operated independently from the RMM or dial up RMM and takes priority over both when used)

ANALOG CONTROL FUNCTIONS:

TRANSMITTER ON/OFF
PRIMARY TRANSMITTER SELECT
RESET TO PRIMARY
NORMAL/TEST
REMOTE PANEL DISABLE
DIAL UP CONTROL DISABLE
AUDIBLE ALARM ENABLE/DISABLE
POWER

ANALOG INDICATORS:

TRANSMITTER ON
PRIMARY TRANSMITTER (TRANSMITTER 1/TRANSMITTER 2)
SYSTEM STATUS
PRIMARY: Selected PRIMARY transmitter operating
SECONDARY: Selected PRIMARY transmitter failed and SECONDARY transmitter operating
FAIL: Both transmitters failed
AUDIBLE ALARM (Alarms whenever system status is FAIL).
REMOTE PANEL DISABLED
DIAL UP CONTROL DISABLED

Remote Radiobeacon Control Panel (Operates independently from the dial up RMM and has priority when used)

ANALOG CONTROL FUNCTIONS:

TRANSMITTER ON/OFF
PRIMARY TRANSMITTER SELECT
RESET TO PRIMARY
AUDIBLE ALARM ENABLE/DISABLE
POWER

ANALOG INDICATORS:

TRANSMITTER ON
AC POWER present (at transmitter site),
PRIMARY TRANSMITTER (TRANSMITTER 1/TRANSMITTER 2)
SYSTEM STATUS



PRIMARY: Selected PRIMARY transmitter operating

SECONDARY: Selected PRIMARY transmitter failed and SECONDARY transmitter operating

FAIL: Both transmitters failed

AUDIBLE ALARM (Alarms whenever system status is FAIL).

DIAL UP CONTROL DISABLED

POWER: 115/230 VAC $\pm 20\%$ 50/60 Hz 5VA.

CIRCUIT PROTECTION: AC line fuse. Control link is transformer isolated by signal transformer meeting MIL-T-27D specifications and 1000 V RMS insulation test voltage. Logic line inputs are isolated by series impedances and diode clamps.

WORKING CONDITIONS: Continuous unattended operation in the following environment: ambient temperature -50°C to 70°C, relative humidity 0 to 100% without condensing moisture.

INSTALLATION REQUIREMENTS: The REMOTE RADIOBEACON CONTROL PANEL is designed for indoor mounting in a standard 19-inch cabinet. Panel height is 7 inches; required panel depth is 5 inches.

General Description: SD50

This non-directional beacon is an Amplitude Modulated transmitter with an adjustable output power from 5 to 50 watts. The transmitter uses switching technology in the power amplifiers and modulator / regulator modules resulting in a highly efficient system, in a small package.

The exciter portion consists of an embedded 32-bit micro controller, an I/O interface circuit, an A/D converter, a monitor circuitry, and an optional voice processing circuitry in a single 3U enclosure. The controller has one "stored" non-volatile memory, redundant RF DDS (Direct Digital Synthesizer), redundant AF (Tone) DDS, and two serial ports (local and remote). Settings for ID mode, ID code, ID rate, sequence of operation and other parameters are set by an user interface program. Simple controls such as power adjustment, percent modulation, and side transfer are available locally for technical setup. Also for convenience, PA voltage, PA current, PA temperature, RF frequency, Tone frequency, Carrier power and percent modulation are displayed locally via 7-segment readouts. A simple switch disables remote control operation during local technical service.

The power portion of each transmitter consists of two independent 50 watts systems. Each system has an output filter, a switching power amplifier and switching modulator / regulator, power supply, and an optional battery supply.

The SD50 Dual consists of two independent SD50 transmitters and a Digitally Controlled Automatic Transfer unit housed in a single cabinet designed for outdoor use.

Transmitter: Model SD50

Qualifications: Meets applicable requirements of ICAO, FCC, FAA, Transport Canada, UK CAA, EC (emissions and safety standards).

Frequency Range: 190-1800 kHz, selectable in 500 Hz increments, stability better than .005% (-40(C to +70(C).

Power Output: Digitally generated carrier power into 50 ohms continuously adjustable 5 to 25 watts.

Spurious Emission: Radiated harmonics (measured at a dummy antenna) are more than 63 dB below the 50-watt carrier.

Type of Emission: NON, A2A, A3E (Optional), GID (with optional GPS beacon modulator), or any combination.

Modulation: Digital generated typically 400 or 1020 Hz.

Noise and Hum Level: More than 40 dB below the carrier level.

Input Power: 115/230V (15%, single phase 50-60 Hz. 24 VDC.

Efficiency: Better than 70% overall efficiency AC input to RF output at 50-watt carrier and tone keying at 95% modulation.

Numeric Digital Display Meters: Power output, reflected power, PA voltage, PA current, percent modulation, audio input level.

Keyer: Any combination of Morse code letters or numerals with any user set values pertaining to the length of dots and dashes, the time between them and the number of repetitions of the identification code per minute (character length dependent).

Circuit Protection: Open and short circuit proof and immune to damage that can be cause by improper antenna loads. Individual fuses are used to protect the AC and DC circuits and immune to severe damage caused by improper installation. VSWR circuit that shuts down the transmitter if VSWR exceeds an adjustable value. Over temperature and standby shutdown.

Working Conditions: Continuous unattended operation in the following environments: ambient temperature, -40(C to +70(C; relative humidity, 0-100%; high salinity as encountered in offshore conditions. IP66. Cooling by heat sinks with no fans.



Monitoring: Transmitter shuts down with loss of tone, drop in modulation below an adjustable value, or continuous tone, or when power falls below an adjustable value, or when VSWR rises above an adjustable value or when temperature rises above an adjustable value or in the event of a change in the code, its duration or rate. With a dual system, a shutdown signal initiates a transfer from the primary transmitter to the secondary transmitter.

Self-Diagnostics: Computer diagnostic routines that identify malfunctioning modules at LRU level available via local or remote PC. Transmitter and antenna coupler are suitable for installation and operation by untrained personnel.

Automatic Transfer Unit

Local Radiobeacon Control Panel (can be operated independently from the RMM or dial up RMM and takes priority over both when used)

ANALOG CONTROL FUNCTIONS:

TRANSMITTER ON/OFF

PRIMARY TRANSMITTER SELECT

RESET TO PRIMARY

NORMAL/TEST

REMOTE PANEL DISABLE

DIAL UP CONTROL DISABLE

AUDIBLE ALARM ENABLE/DISABLE

POWER

ANALOG INDICATORS:

TRANSMITTER ON

PRIMARY TRANSMITTER (TRANSMITTER 1/TRANSMITTER 2)

SYSTEM STATUS

PRIMARY: Selected PRIMARY transmitter operating

SECONDARY: Selected PRIMARY transmitter failed and SECONDARY transmitter operating

FAIL: Both transmitters failed

AUDIBLE ALARM (Alarms whenever system status is FAIL).

REMOTE PANEL DISABLED

DIAL UP CONTROL DISABLED

Remote Radiobeacon Control Panel (Operates independently from the dial up RMM and has priority when used)

ANALOG CONTROL FUNCTIONS:

TRANSMITTER ON/OFF

PRIMARY TRANSMITTER SELECT

RESET TO PRIMARY

AUDIBLE ALARM ENABLE/DISABLE

POWER

ANALOG INDICATORS:

TRANSMITTER ON

AC POWER present (at transmitter site),

PRIMARY TRANSMITTER (TRANSMITTER 1/TRANSMITTER 2)

SYSTEM STATUS

PRIMARY: Selected PRIMARY transmitter operating

SECONDARY: Selected PRIMARY transmitter failed and SECONDARY transmitter operating

FAIL: Both transmitters failed



AUDIBLE ALARM (Alarms whenever system status is FAIL).

DIAL UP CONTROL DISABLED

POWER: 115/230 VAC $\pm 20\%$ 50/60 Hz 5VA.

CIRCUIT PROTECTION: AC line fuse. Control link is transformer isolated by signal transformer meeting MIL-T-27D specifications and 1000 V RMS insulation test voltage. Logic line inputs are isolated by series impedances and diode clamps.

WORKING CONDITIONS: Continuous unattended operation in the following environment: ambient temperature -50°C to 70°C , relative humidity 0 to 100% without condensing moisture.

INSTALLATION REQUIREMENTS: The REMOTE RADIOBEACON CONTROL PANEL is designed for indoor mounting in a standard 19-inch cabinet. Panel height is 7 inches; required panel depth is 5 inches.



General Description: SD100

This non-directional beacon is an Amplitude Modulated transmitter with an adjustable output power from 5 to 100 watts. The transmitter uses switching technology in the power amplifiers and modulator / regulator modules resulting in a highly efficient system, in a small package.

The exciter portion consists of an embedded 32-bit micro controller, an I/O interface circuit, an A/D converter, a monitor circuitry, and an optional voice processing circuitry in a single 3U enclosure. The controller has one "stored" non-volatile memory, redundant RF DDS (Direct Digital Synthesizer), redundant AF (Tone) DDS, and two serial ports (local and remote). Settings for ID mode, ID code, ID rate, sequence of operation and other parameters are set by an user interface program. Simple controls such as power adjustment, percent modulation, and side transfer are available locally for technical setup. Also for convenience, PA voltage, PA current, PA temperature, RF frequency, Tone frequency, Carrier power and percent modulation are displayed locally via 7-segment readouts. A simple switch disables remote control operation during local technical service.

The power portion of each transmitter consists of two independent 100 watts systems. Each system has an output filter, a switching power amplifier and switching modulator / regulator, power supply, and an optional battery supply.

The SD100 Dual consists of two independent SD100 transmitters and a Digitally Controlled Automatic Transfer unit housed in a single cabinet designed for outdoor use.

Transmitter: Model SD100

Qualifications: Meets applicable requirements of ICAO, FCC, FAA, Transport Canada, UK CAA, EC (emissions and safety standards).

Frequency Range: 190-1800 kHz, selectable in 500 Hz increments, stability better than .005% (-40(C to +70(C).

Power Output: Digitally generated carrier power into 50 ohms continuously adjustable 5 to 100 watts.

Spurious Emission: Radiated harmonics (measured at a dummy antenna) are more than 63 dB below the 100-watt carrier.

Type of Emission: NON, A2A, A3E (Optional), GID (with optional GPS beacon modulator), or any combination.

Modulation: Digital generated typically 400 or 1020 Hz.

Noise and Hum Level: More than 40 dB below the carrier level.

Input Power: 115/230V (15%, single phase 50-60 Hz. 24 VDC.

Efficiency: Better than 70% overall efficiency AC input to RF output at 100-watt carrier and tone keying at 95% modulation.

Numeric Digital Display Meters: Power output, reflected power, PA voltage, PA current, percent modulation, audio input level.

Keyer: Any combination of Morse code letters or numerals with any user set values pertaining to the length of dots and dashes, the time between them and the number of repetitions of the identification code per minute (character length dependent).

Circuit Protection: Open and short circuit proof and immune to damage that can be cause by improper antenna loads. Individual fuses are used to protect the AC and DC circuits and immune to severe damage caused by improper installation. VSWR circuit that shuts down the transmitter if VSWR exceeds an adjustable value. Over temperature and standby shutdown.

Working Conditions: Continuous unattended operation in the following environments: ambient temperature, -40(C to +70(C; relative humidity, 0-100%; high salinity as encountered in offshore conditions. IP66. Cooling by heat sinks with no fans.



Self-Diagnostics: Computer diagnostic routines that identify malfunctioning modules at LRU level available via local or remote PC. Transmitter and antenna coupler are suitable for installation and operation by untrained personnel.

DIAL UP CONTROL DISABLED

FAIL: Both transmitters failed



AUDIBLE ALARM (Alarms whenever system status is FAIL).

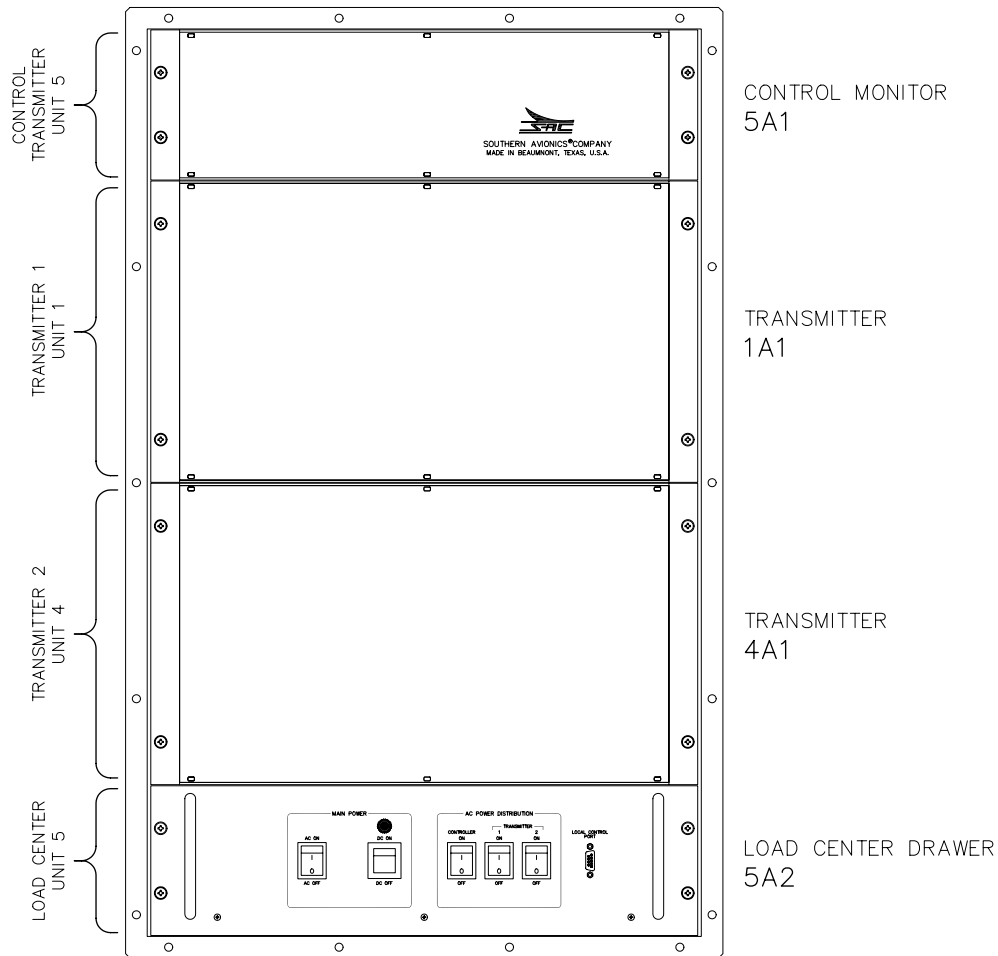
DIAL UP CONTROL DISABLED

POWER: 115/230 VAC $\pm 20\%$ 50/60 Hz 5VA.

CIRCUIT PROTECTION: AC line fuse. Control link is transformer isolated by signal transformer meeting MIL-T-27D specifications and 1000 V RMS insulation test voltage. Logic line inputs are isolated by series impedances and diode clamps.

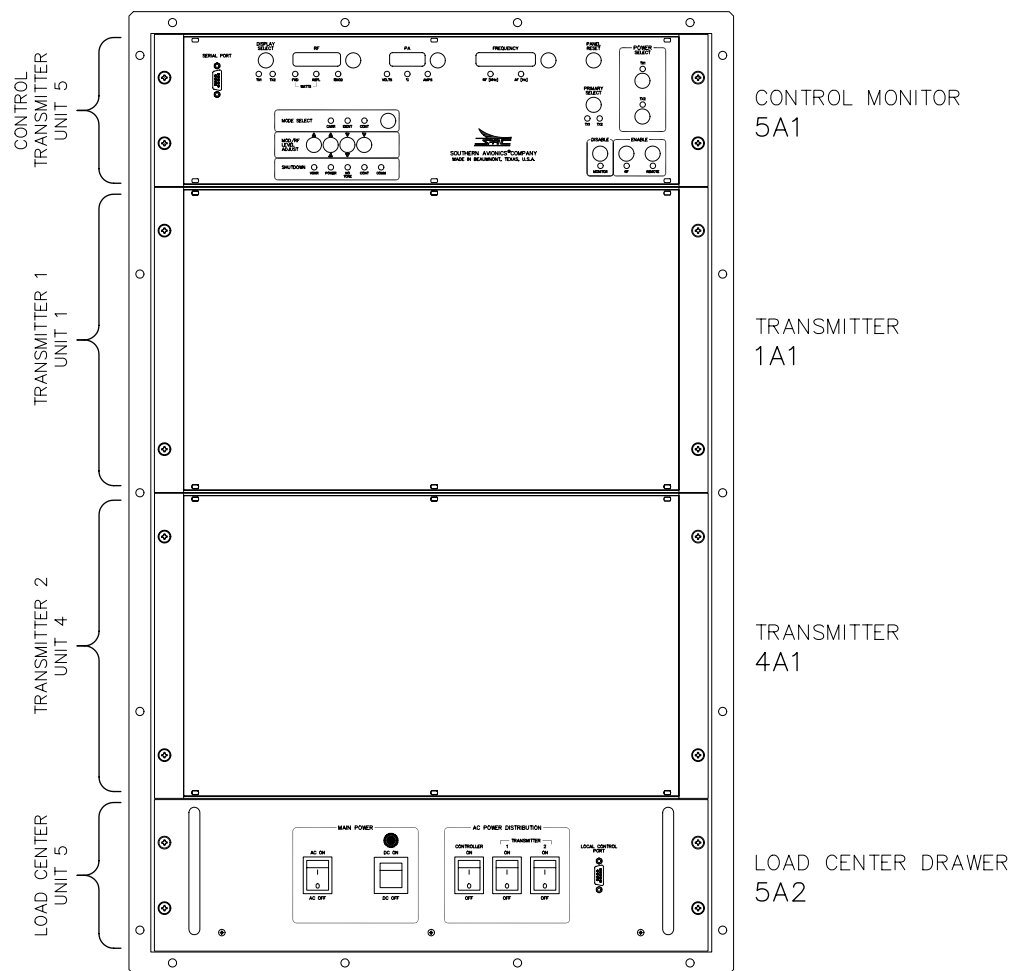
WORKING CONDITIONS: Continuous unattended operation in the following environment: ambient temperature -50°C to 70°C, relative humidity 0 to 100% without condensing moisture.

INSTALLATION REQUIREMENTS: The REMOTE RADIOBEACON CONTROL PANEL is designed for indoor mounting in a standard 19-inch cabinet. Panel height is 7 inches; required panel depth is 5 inches.



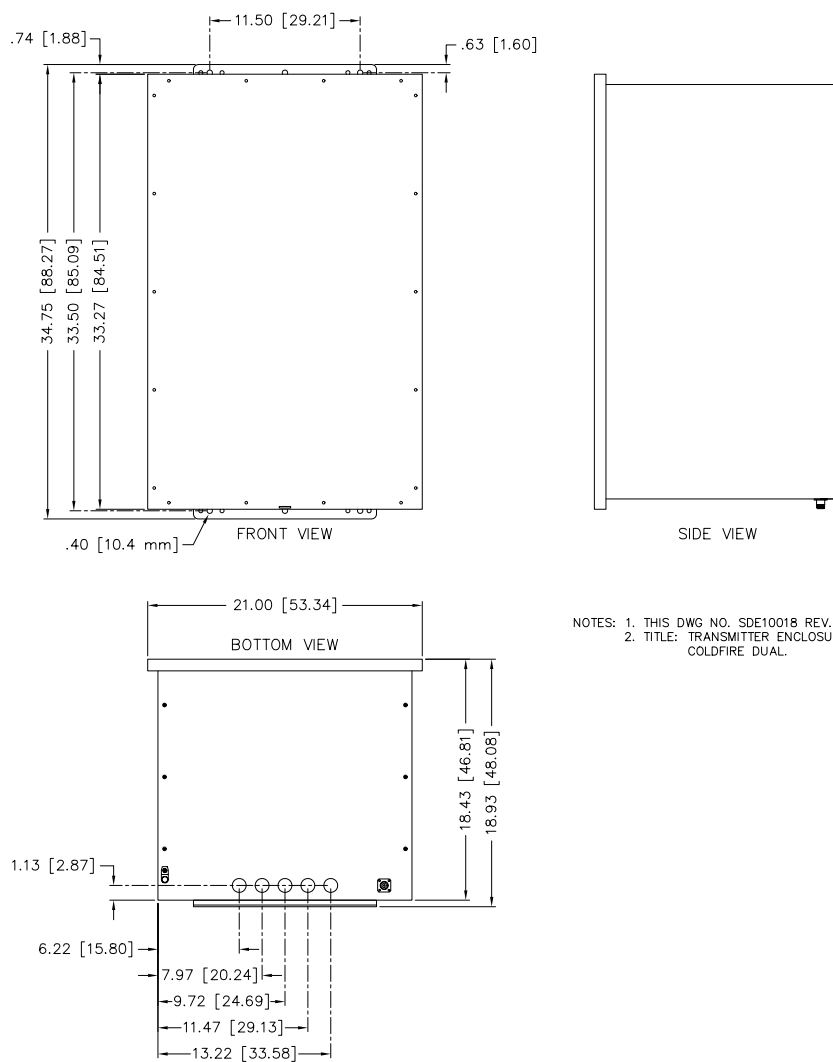
NOTES: 1. THIS DWG NO. SDE10018 REV. 2. SH 2 OF 3
2. TITLE: TRANSMITTER PORTRAIT COLDFIRE DUAL.

SDE10018 - DUAL TRANSMITTER PORTRAIT



NOTES: 1. THIS DWG NO. SDE10018 REV. 2. SH 3 OF 3
2. TITLE: TRANSMITTER PORTRAIT COLDFIRE DUAL.

SDE10018 - DUAL TRANSMITTER PORTRAIT WITH LOCAL CONTROL PANEL



SDE10018 - TRANSMITTER ENCLOSURE DIMENSIONS



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2 THEORY OF OPERATION, SD SERIES UNIT

2.1 Functional Description: SD Series Transmitter

General Theory of Operation

Briefly, the SDxx system takes advantage of the powerful Motorola ColdFire(r) microprocessor. It is located on the Controller / Monitor PCB and is the heart of the system, generally controlling all system operation either directly or in conjunction with an Analog and Digital I/O multiplexing interface.

The following are all controlled by the embedded firmware, Direct Digital Synthesis (DDS) of RF frequency and AF tone frequency, Identifier Morse code dot, dash and space intervals., Customer IDENT sequence, the standard alarms, any additional Fault handling based on multipoint voltage, current and temperature monitoring, transfer criteria (Dual Only), power limiting and modulation limiting.

RS 232, RS422 and RS485 protocols are supported. A US Robotics Modem is furnished for using phone lines.

The RF section consists of the RF PA Power Supply, The RF PA Amplifier, The Filter /Bridge, and the Mother Board which interconnects them all. This section is interconnected with the Controller/Monitor which Dictates the Frequency of operation, power output, and modulation percentage. Operational information is also passed. A more detailed breakdown as to functionality follows on a board by board basis.

SLP10007 - Controller / Monitor

The CONTROLLER/ MONITOR employs the new Motorola MCF5206 COLDFIRE(r) microprocessor. It encompasses the following sections:

- COLDFIRE Processor - 32-bit
- ADC - 8-Channel 12-bit
- DAC - 8-Channel 8-bit
- DDS - Radio Frequency (190K to 1800KHz)
- DDS - Tone Frequency (400 / 1020 Hz)
- Flash Memory - 4Mb
- DRAM - 16Mb
- Programmable Logic
- Digital I/O (Read/Write)
- UART
- Watch Timer and NV-RAM

COLDFIRE Processor section:

The LOGIC program creates 16MHz from 32MHz for the clock frequency of the microprocessor. The processor controls several peripheral functions such as memory, task timers, I/O bus lines, and RS-232 ports. For the dual system, the primary Controller / Monitor and secondary Controller / Monitor may talk to each other through Controller / Monitor Motherboard (SLP10012) by using 2 COM-PORT lines (ex: RXD & TXD). Each Controller / Monitor has one interrupt line for paying attention what other Controller / Monitor has something is important, then Controller / Monitor sets "RS-232" MUX to be enabled.

Analog-to-Digital converter (ADC) section:

The Controller / Monitor Controller PCB has two (AD7891) 12-bit ADC chips, so there are 16 analog inputs. The channel selection of input range is 0 to +5 V.



Digital-to-Analog Converter (DAC) section:

The 8-bit DAC provides eight digitally controlled dc voltage outputs. The limited of output range is 0 to +5 V. The user may adjust dc analog level or turn on/off likely digital level.

RF Direct Digital Synthesizer (DDS) section:

The 50MHz clock input is for the RF DDS. The RF DDS provides two different signal-waves (square wave and sine wave). The square wave level is 0 to +5.0 V (recommended) and the sine wave level is 0 to 1.0 V. The DDS has 8 data digitally inputs. The code may store 4 data bytes for the 32-bit RF DDS tuning word. RF is enabled by writing the desired frequency to the DDS, and disabled by writing a zero frequency to the DDS. The RF DDS goes the signal through EMI filter to generate a low jitter square wave output.

Tone Frequency Direct Digital Synthesizer section:

The 50MHz clock input is also used by the AF DDS. The AF DDS signal is sine wave only. The user may adjust AF amplitude modulation. Two methods for keying the tone are available. The first is like the RF DDS - load a frequency into the registers of the DDS chip. The second is simply "keying" (digital ON/OFF) of a reserved I/O signal. The settings for ID mode, ID code, ID rate, sequence of operation and other parameters are set by a user interface program.

Flash Memory section:

Its 4Mb of memory is organized as 512K x 8. The firmware for the E(E)PROM is written in assembly / C code. It may move data to DRAM and NV-RAM memory when the power is up. It is simple to replace when the code is updated.

DRAM section:

The PCB has two DRAM devices. It totals 1Mb x 16 x 2 (32-bit data). During initialization the EPROM moves data to the DRAM.

Programmable LOGIC (LATTICE device) section:

There are two LATTICE chips on the PCB. The Programmable Logic provides several necessary functions such as control lines, 1Hz, 16MHz, enabled / disabled lines and interrupt lines.

Digital I/O section:

There are 32 digital inputs or outputs and 4 control lines for writing. Each control has 8 data lines organized as one byte each. They are used for the status fault, frequency reading, reset, and control data.

Universal Synchronous/Asynchronous Receiver/Transmitters (UART) section:

The Controller / Monitor processor has two UARTs. They are used for RS-232 only. SAC offers four possible transmitter configurations as follows:

Single TX without a LOCAL CONTROL panel:

The Controller / Monitor serial port 1 is probably used for PC.

The Controller / Monitor serial port 2 is used for PC / Modem through Controller / Monitor Motherboard (Controller / Monitor MB - SLP10012).

Single TX with a LOCAL CONTROL panel:

The Controller / Monitor serial port 1 is used for the local operating panel.

The Controller / Monitor serial port 2 is used for PC / Modem through Controller / Monitor MB.

Dual TX without a LOCAL CONTROL panel:

Either Controller / Monitor1 or Controller / Monitor2 serial port 1 is probably used for PC.

The serial port 2 is used for PC / Modem through Controller / Monitor MB.

Dual TX with a LOCAL CONTROL panel:

Either Controller / Monitor1 or Controller / Monitor2 serial port 1 is used for local operating panel.
The serial port 2 is used for PC / Modem through Controller / Monitor MB.

Watch Timer and NV-RAM section:

The NV-RAM provides 32Kb of memory available to the user. The NV-RAM can hold data more than 10 years in the absence of power. It allows the operator to store various settings in NV memory. When the power is up, Controller / Monitor can follow the user settings in NV memory. The Watchdog timer restarts an out of control Controller / Monitor processor. The code may use the real-time clock for 255 task timers (background).

SLP10009 Digital I/O and PWM Theory

The Digital I/O and PWM PCB consists of several sub sections which accomplish the following functions:

Digital Input State Reading
Digital Output Control
Frequency Counting
Audio to PWM Conversion
AWOS Option.

The Digital Input Section receives and conditions state information from the various system modules mainly indicating the fault status of these sections but also monitoring the state of other sensors. While retaining their unique state value all of these signals are combined into one interrupt request (IRQ) line for rapid servicing of external events. A local red fault LED indicates the arrival of a fault condition. The processor take action depending on the nature of the condition.

The Digital Output Section conditions and outputs a state condition to the various system modules primarily to perform fault resets. Antenna switching is also controlled by this section.

The Frequency Counter section conditions and samples the Direct Digital Synthesizer generated frequency from the RF power amplifier. This data is relayed to the processor which monitors the output RF frequency for accuracy.

The PWM section of this board inputs audio signals from the tone generating Direct Digital Synthesizer and from an optional voice input piggybacked PCB for AWOS functionality. The composite audio signal is summed with an adjustable DC level and converted into a 75 kHz Pulse Width Modulated signal with its basic no-audio duty cycle being set at a fixed percentage. This fixed level facilitates modulation tracking irregardless of power level output. A back-up modulation limiting circuit prevents over-modulation from damaging the RF Amplifier but main over modulation protection control for Tone signals is a software function of the processor which monitors modulation at all times.

The Optional AWOS plug in PCB Contains an AGC section which prevents over-modulation by the USER audio signal. There is also a built in active Audio band-pass filter which eliminates signals outside of the 300 to 3000Hz pass band. Signals generated on this Optional PCB also alert the processor which then cuts the main tone level and temporarily ceases issuing any modulation alarms based on modulation percentage.

SLP10020 OPTIONAL AUDIO PCB (AWOS)



The Audio PCB is an OPTIONAL addition to the normal system which allows the user to broadcast AWOS announcements. The Option is implemented as a plug in piggyback board to the Digital I/O PCB and consists of four sections as follows:

Voice Amplifier
Automatic Gain Control
Chebychev Passband Filter
Voice Detector

The Voice amplifier takes the nominal -17dBm signal level and boost it to a level useable by the AGC section
It is common mode balanced and its Gain is adjustable.

The AGC circuit is responsible for modulation limiting. It is adjusted to "capture" the level at -17dBm and output a constant modulation level to the Digital I/O PWM section up to levels exceeding +10 dBm. This section prevents inadvertent over modulation of the voice signal, and is necessary since the Controller / Monitor has no control over user input.

The Chebychev Passband filter is designed for 300 to 3000 Hz. The output at 4000 Hz is down more than 45 dB ensuring any out of band audio signals from the USER will not cause adjacent channel interference.

The Voice Detector has two functions. It detects the presence of an announcement sequence and automatically attenuates the Keying tone level down to 20% modulation. The announcement level is summed with the Keying tone level and set to achieve 95% composite modulation. This action prevents over modulation and allows the announcement to be heard over the beacon Morse code IDENT tones. It also signals the Controller /Monitor which in turn temporarily suspends Modulation Alarms since the IDENT tone level is dropped below the alarm threshold.

SLP10005 Analog I/O

The Analog I/O and PWM PCB consists of several sub sections which accomplish the following functions:

Analog Signal Input
Analog Signal Output
Modulation Detection

The Analog Input Section is essentially a 40 channel low pass filtered analog MUX. These multiplexed inputs are actually an expansion scheme which adds additional analog inputs to those already available to the controller/monitor. This allows the overall system to be expanded to control larger multi-section transmitters up to 1KW at present.

Signals such as RF Power Amplifier voltage, current and temperature, to name only a few, are sampled and read in to the Controller / Monitor via this MUX. The multiplexing process is directly controlled by the Controller Monitor.

The Analog Signal Output Section is a smaller MUX facilitating output control expansion. As an example, an analog control signal originating in the Controller / Monitor such as PWR_LEVEL (a 0.0 to 4.0 volt DC level) is

sent to this Sample and Hold MUX channel 1. Via this channel the MUX outputs this particular level to the PA Power Supply which dictates the output power level of the transmitter. The Next Channel of the MUX can control yet another module requiring some level of control voltage if needed.

The Modulation Detector receives a detected sample of the RF envelope from the bridge circuit and converts it into two DC levels called V_{max} and V_{gref} . The Controller / Monitor reads in these levels and subtracts V_{gref} from V_{max} to derive V_{min} . V_{max} and V_{min} are then used in the standard modulation formula to obtain modulation percentage in the same way as someone would calculate it manually using an oscilloscope. This circuit is intended to free the Controller / Monitor from having to sample large amounts of envelope data to statistically calculate the percentage thereby facilitating more of a real-time monitoring of modulation. Correction curves are embedded to resolve linearity issues arising from the detection process.

SLP10017 Low Voltage Power Supply

The LVPS Furnishes +5, +12, and -12VDC to the Controller/ Monitor Mother Board and itself plugs into the mother PCB. It is transformer driven to allow for 115/230VAC operation. 48VDC operation allows running off of emergency battery. The LVPS also passes 50VDC or 48V BATTERY to the user section to power miscellaneous circuitry.

SLP10003 PA Power Supply Theory

The PA Power Supply (PAPS)

The PA Power Supply consists of three sub-sections, namely, the Inrush Current section, the DC Controller, and the DC-DC Converter. Included with these are associated signal sense and fault circuitry. Taking them one at a time in the general structure of their usage follows.

1.) The Inrush Current Section:

After receiving the HV-ON signal from the Controller / Monitor, this section switches on HV-DC and controls the charge rate of the HV DC supply capacitors to avoid damagingly high inrush currents. It does this by limiting the charge current and monitoring the voltage build-up on the large capacitor bank until it reaches an acceptable charge level, after which unlimited current is applied. The Raw HV is sampled and fed back to the Controller / Monitor.

2.) The DC Controller

This section is a buck regulator with feedback control to reduce the Raw HV DC down to level usable by the RF Power Amplifier section. Under Controller / Monitor control, the output of this section can be varied, which in turn will vary the power output of the RF Power Amplifier. The feedback allows the DC Controller to respond to the peak power demands of the PA greatly reducing or eliminating carrier droop. This section Also isolates the PA from input power fluctuations and or "brown-outs", and maintains a steady power output over widely varying conditions. Since the DC Controller controls the RF power output and the PA sections modulator can run a constant carrier level duty cycle, power can be changed with out resetting the modulation percentage. The DC Controllers Voltage and Current output is sampled and fed back to the Controller / Monitor for monitoring. Fault conditions for current and voltage will automatically shut down the section and report to the Controller / Monitor which can attempt to bring the unit back on line if the problem was transitory or perhaps switch transmitters if the system is a dual configuration.



3.) The DC-DC Converter

The converter will take an optional 48VDC battery back-up source and produce HV which is combined with the normal AC HVDC to provide a seamless transition from AC to DC operation in the event of a Brownout or AC power failure. It is purposely set lower than the nominal AC HVDC to allow for simple diode combining and to preserve battery life while outputting a legal signal. It is NOT regulated but rather will slowly output less HV as the batteries drain. If regulated it would draw more and more current as the batteries became weaker. Since the system is computer controlled decisions can be made to stay on the air at reduced power levels in emergency situations allowing battery conservation . The Converter is a basic Chopped DC-DC converter with over-current sensing and local fault shutdown latches. The fault condition is also reported to the Controller / Monitor. A Reset of all latched fault logic states can be performed by the Controller / Monitor as necessary. A dual low voltage +12VDC supply 12VA and 12VB is fed by +50VDC derived from the AC line or 48VDC supplied by the battery backup ensuring continuous operation of the low level stages after the initial power on. The separated 12V feeds ensures minimal cross-talk between the DC-DC Controller and the DC Controller. As an aside the 50VDC supply (located elsewhere depending on the system) is also monitored by the Controller / Monitor along with 48VDC Battery current and voltage for diagnostic information.

SLP10001 RF Power Amplifier

The RF Power Amplifier PCB is a Pulse Width Modulator and RF power amplifier in one package. The Pulse width Modulator section is commonly called the Modulator and the RF Power Amplifier is commonly called the PA. These terms will be used for the rest of this discussion.

The PA section is comprised of a broadband pre-amplifier and Class "D" RF power amplifier. It inputs either the Controller / Monitor controlled Direct Digital Synthesized RF drive signal or a customer furnished signal. Its output power is controlled by the Modulator.

The Modulator is basically a 75 kHz buck converter. It inputs D.C. High Voltage from the PA Power supply Section and uses a 75 kHz square-wave input from the Controller / Monitor-I/O section to chop, filter and reduce the DC-HV to a level usable by the PA. The Voltage the Modulator outputs to the PA is a function of both the input HV and the duty cycle of the 75 KHz square-wave. The 75 kHz Duty cycle of is set to 45% and not used to change the overall RF Power output level. The power output level of the PA is set by changing the input DC-HV and this is done under Controller / Monitor control. To Modulate the PA, audio frequency information in the form of a Morse Code Station ID tone sequence or an AWOS voice announcement, pulse width modulates the 75 kHz signal controlling the Modulator section thus varying its output voltage at the audio rate. This varies the instantaneous voltage applied to the PA, modulating its output Power.

Critical parameters such as PA Voltage , Current , and Temperature are sensed and monitored continuously by the Controller / Monitor. Local (on board automatic) over-current protection is built in. The protection scheme also provides interrupt driven fault reporting to the Controller / Monitor.

SLP10002 Filter/Bridge PCB Theory

The Filter/Bridge includes a broadband toroidal impedance transformer, a seven pole Butterworth low pass filter, a broadband RF power bridge, modulation envelope detector and associated level sampling and fault latching circuitry.

The Impedance transformer receives as input the RF Power Amplifiers Class D output and impedance matches it to the 50Ohm Butterworth Low Pass Filter, which is configured for optimum characteristics via simple jumpers for the frequency band in use. The sinusoidal 50Ohm output of the Filter is Fed then fed through the RF power bridge which reports readings of Forward and Reflected RF Power to the Controller / Monitor. The Controller / Monitor then normalizes and calibrates the power curve and calculates SWR. Fault latches are also set up to report High reflected

power or RF over-current conditions for immediate action via a fault interrupt structure. A sample of the final RF output envelope is detected and sent back to the Controller / Monitor where other circuitry derives Vmax/Vmin information for modulation percentage calculation via Controller / Monitor firmware.

SLP10016 - OPTIONAL Local / Remote Control

The Optional Local Control can be used as either a local or remote operating panel. The Local Control is a microprocessor-based (Motorola M68HC11) unit offering partial control over the controller / monitor and thereby the system. It offers similar functionality to a standard front panel on older equipment.

Pushbuttons allow the user to select and or control the following:

Primary Transmitter Select (1 or 2)
Mode Select (ID, CONT or CARR)
Transmitter Displayed (1 or 2)

And view readings of: readings for:

PA Voltage
PA Current
PA Temperature
Forward Power
Reflected Power
Modulation%
Audio Frequency (tone)
RF Frequency

The user can adjust or set the:

Modulation Percentage
RF Power output level
RF ON/OFF
Enable/Disable Alarms
Select Local/Remote Control

When one of any pushbuttons is pressed except RESET, the 6811 processor sends a data command to the Controller / Monitor through the serial communication port.

RESET forces Local Panel re-initialization.

The 7 segment led display update comes from the Controller / Monitor The displays provide the 3 following groups for reading:

RF Power:

Up to 4 digits display the Modulation%, forward power and reflected power.

Power Amplifier (P.A.):

Up to 3 digits Display the voltage, current and temperature.

Frequency:

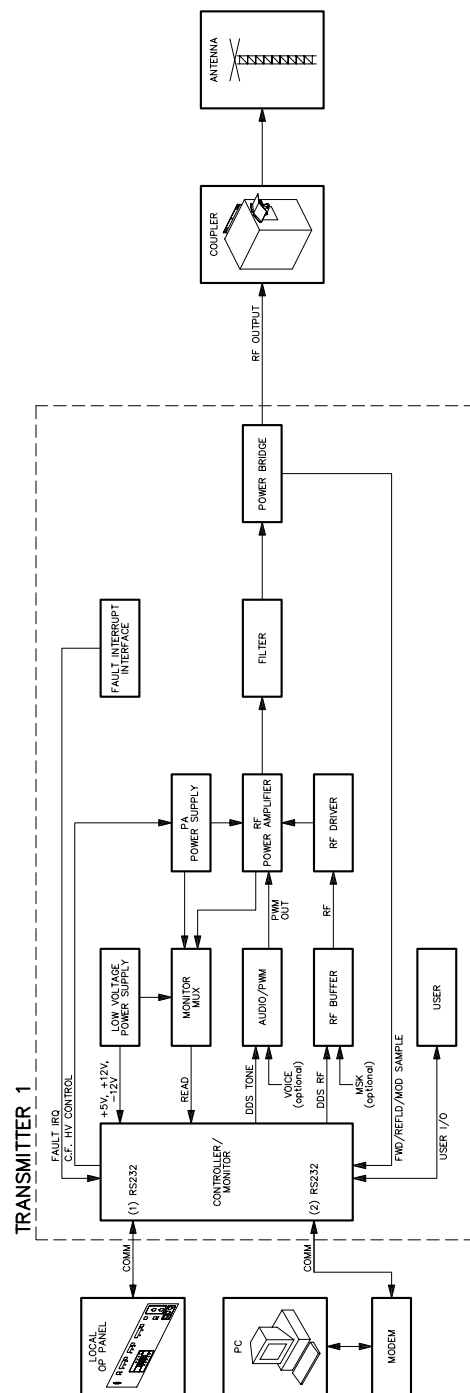
Up to 5 digits display the tone frequency (set) and RF frequency (measured).

The LED indicators simply display the system status. The Local Control receives a command string from the Controller / Monitor and uses this to set the status indicators.

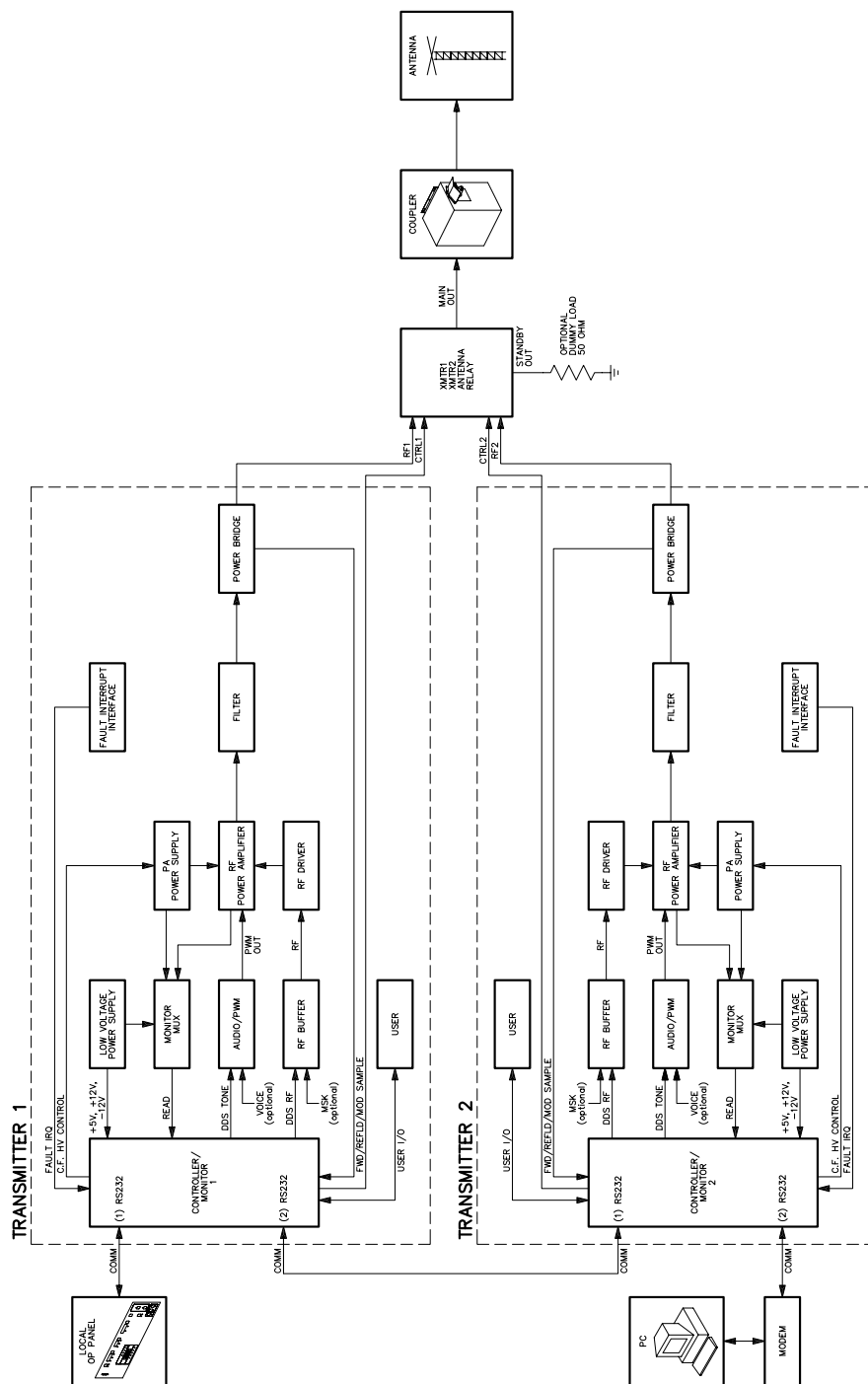


The complex logic needed to for pushbutton control and display is accomplished using programmable gate-array logic.

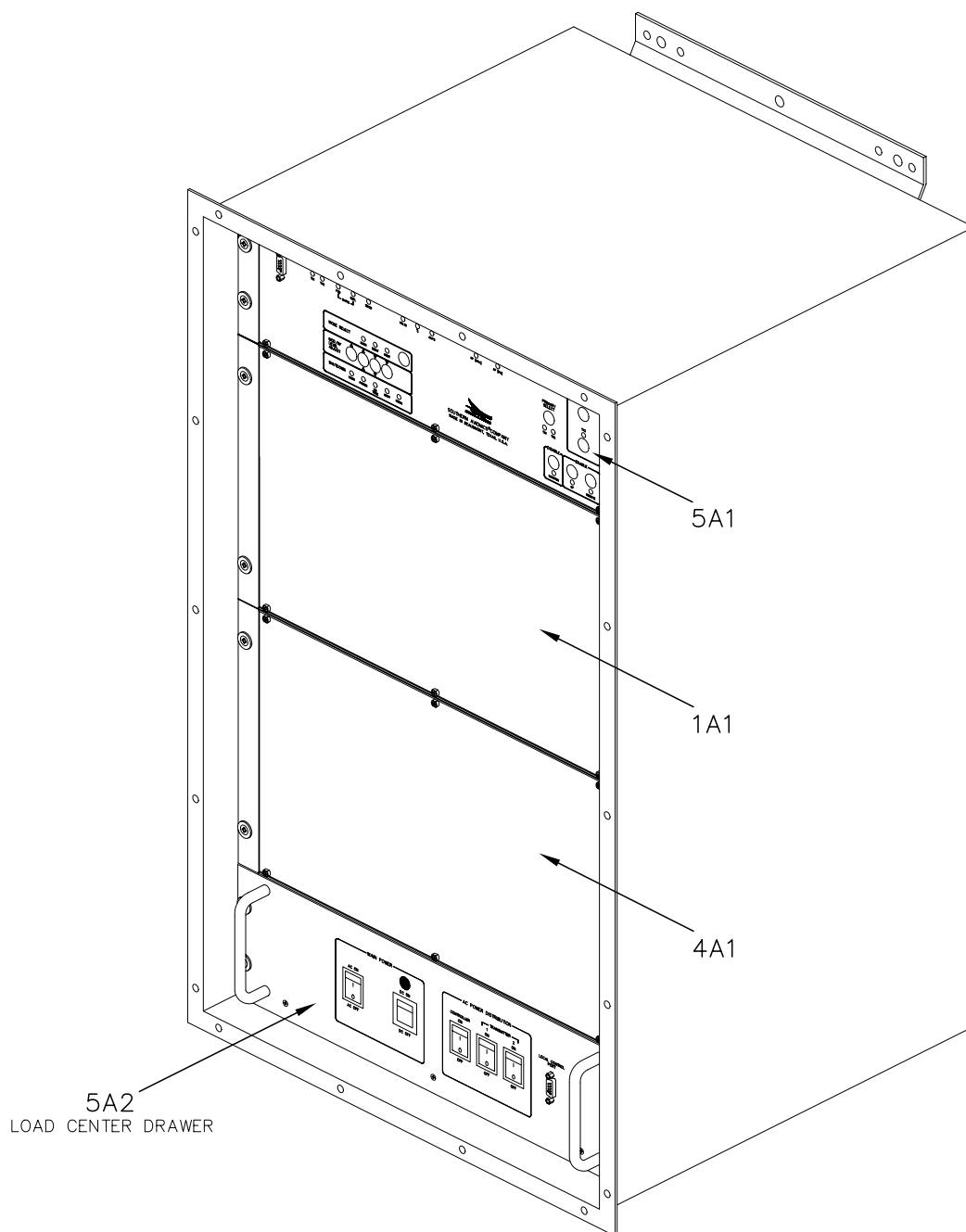
The Local Control provides two serial communication ports (RS-232 / RS-485). The RS-232 port is used locally for the Controller / Monitor serial port 1. The RS-485 port is connected remotely to the Controller / Monitor port 1.



SDB10001 - SD SERIES SINGLE TRANSMITTER BLOCK DIAGRAM



SDB10002 - SD SERIES DUAL TRANSMITTER BLOCK DIAGRAM

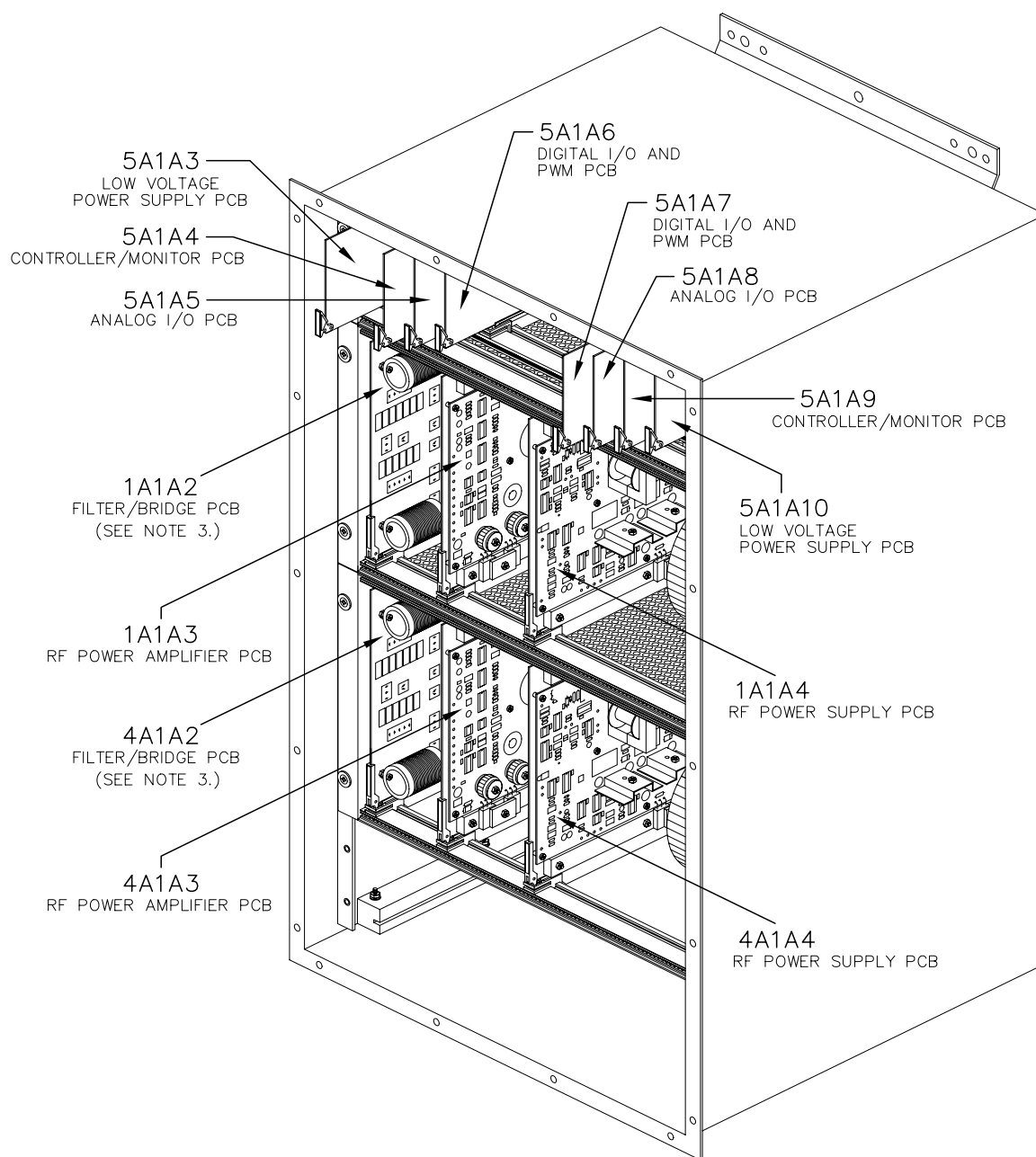


NOTES: 1. THIS DWG NO. SDF31002 REV. 2. SH 3 OF 3
2. TITLE: SD SERIES DUAL TRANSMITTER
BASIC DIAGRAM.

SDF31002 - SD SERIES BASIC DUAL TRANSMITTER DIAGRAM
PAGE 1 OF 2

SOUTHERN AVIONICS COMPANY

SD SERIES TRANSMITTER

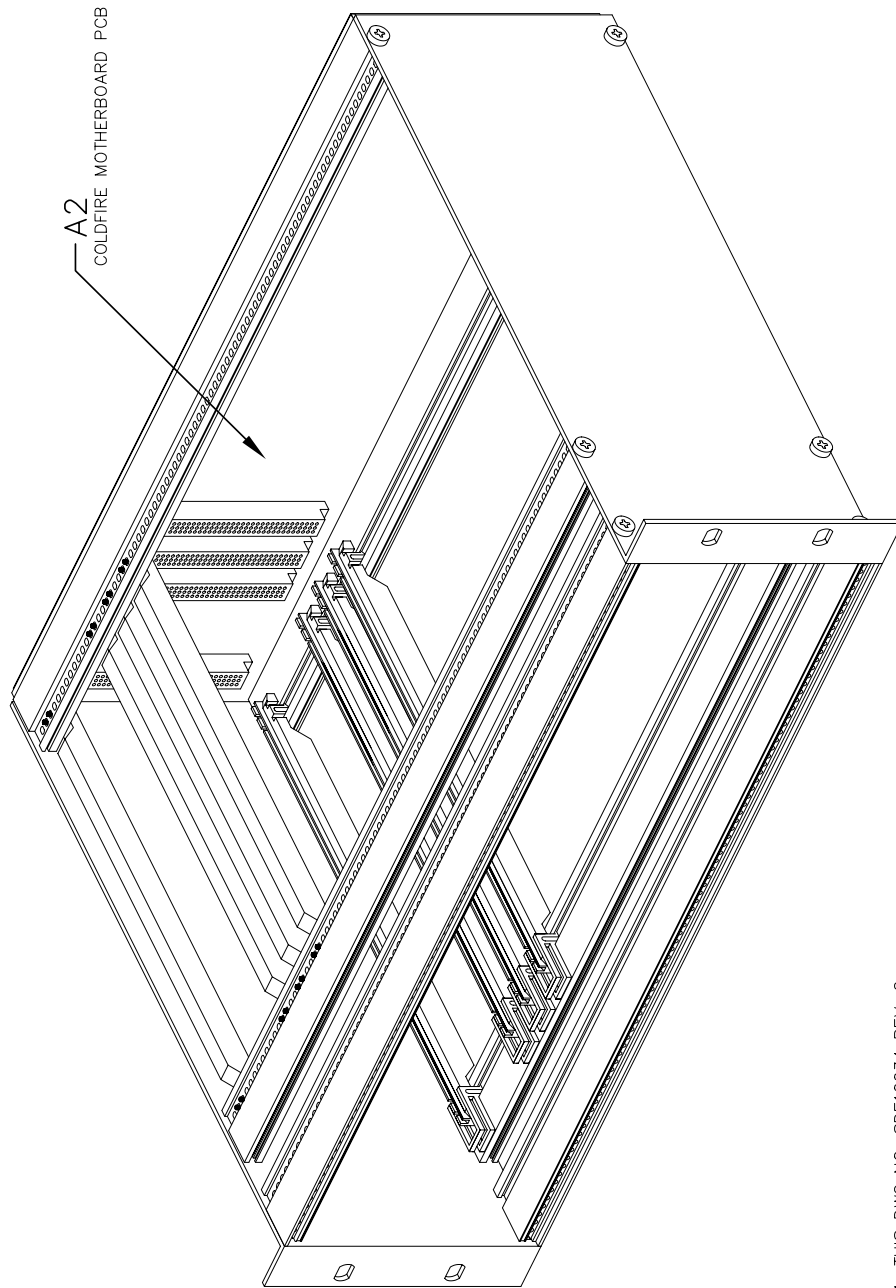


- NOTES: 1. THIS DWG NO. SDF31002 REV. 2. SH 1 OF 3
 2. TITLE: SD SERIES DUAL TRANSMITTER
 BASIC DIAGRAM.
 3. FILTER PCB's ARE INSTALLED AT NEXT LEVEL ASSEMBLY.
 • FOR SLF31002/01 (STANDARD BAND), USE FILTER PCB SLP10002/00.
 • FOR SLF31002/02 ("M" BAND), USE FILTER PCB SLP10002/01.
 • FOR SLF31002/03 ("H" BAND), USE FILTER PCB SLP10002/02.

SDF31002 - SD SERIES BASIC DUAL TRANSMITTER DIAGRAM - CONTINUED
PAGE 2 OF 2

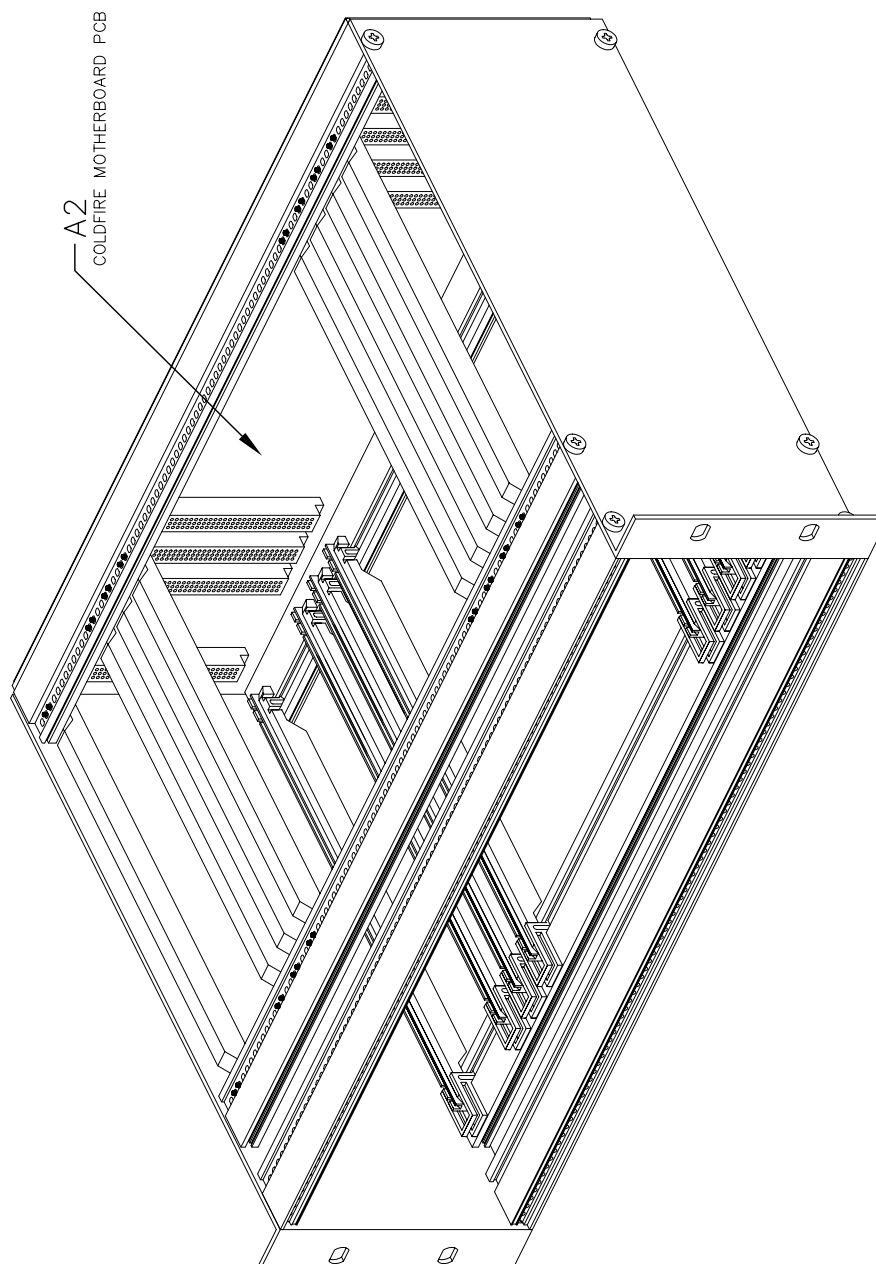
SOUTHERN AVIONICS COMPANY

SD SERIES TRANSMITTER



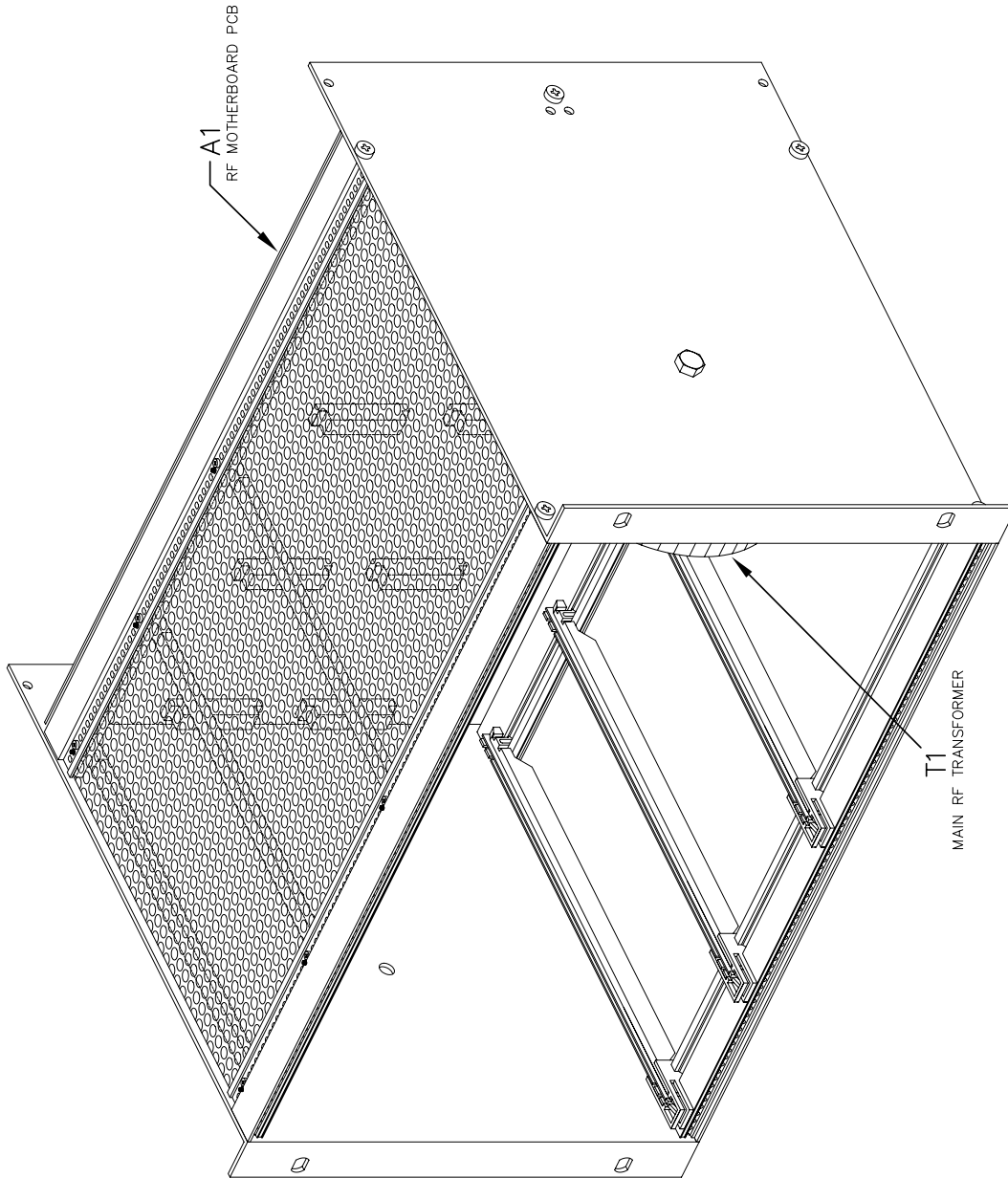
NOTES: 1. THIS DWG NO. SDE10034 REV. 2.
2. TITLE: COLD FIRE SINGLE CONTROL MONITOR DIAGRAM.

SDE10034 - SINGLE CONTROL DIAGRAM



NOTES: 1. THIS DWG NO. SDE10032 REV. 2.
2. TITLE: COLDFIRE DUAL CONTROL MONITOR DIAGRAM.

SDE10032 - DUAL CONTROL 3U DIAGRAM



NOTES: 1. THIS DWG NO. SDE10033 REV. 2.
2. TITLE: TRANSMITTER DIAGRAM.

SDE10033 - DUAL TRANSMITTER CONTROL 6U DIAGRAM



2.2 SLF31002/00 - Basic Dual Transmitter

2.2.1 P.A. PCB

SLP10001 RF Power Amplifier

The RF Power Amplifier PCB is a Pulse Width Modulator and RF power amplifier in one package. The Pulse width Modulator section is commonly called the **Modulator** and the RF Power Amplifier is commonly called the **PA**. These terms will be used for the rest of this discussion.

The PA section is comprised of a broadband pre-amplifier and Class "D" RF power amplifier. It inputs either the Controller / Monitor controlled Direct Digital Synthesized RF drive signal or a customer furnished signal. Its output power is controlled by the Modulator.

The Modulator is basically a 75 kHz buck converter. It inputs D.C. High Voltage from the PA Power supply Section and uses a 75 kHz square-wave input from the Controller / Monitor-I/O section to chop, filter and reduce the DC-HV to a level usable by the PA. The Voltage the Modulator outputs to the PA is a function of both the input HV and the duty cycle of the 75 KHz square-wave. The 75 kHz Duty cycle of is set to 45% and not used to change the overall RF Power output level. The power output level of the PA is set by changing the input DC-HV and this is done under Controller / Monitor control. To Modulate the PA, audio frequency information in the form of a Morse Code Station ID tone sequence or an AWOS voice announcement, pulse width modulates the 75 kHz signal controlling the Modulator section thus varying its output voltage at the audio rate. This varies the instantaneous voltage applied to the PA, modulating its output Power.

Critical parameters such as PA Voltage , Current , and Temperature are sensed and monitored continuously by the Controller / Monitor. Local (on board automatic) over-current protection is built in. The protection scheme also provides interrupt driven fault reporting to the Controller / Monitor.

SLP10001 - Assemblby, PCB, RF Power Amplifier

<u>REFERENCE DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
01	SRP10001	PCB, POWER AMPLIFIER \ DMOD
C01	1C263050	CAP, 3.3M, 250V, METALLIZED FILM
C02	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C03	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C04	1C854750	CAP, .47 UF, 250V METAL POLY
C05	1C254750	CAP, .47M, 250V, MF
C06	1C253371	CAP, .33M 400V METALLIZED FILM
C07	1C254710	CAP, .47M 50V METAL FILM
C08	1C254710	CAP, .47M 50V METAL FILM
C09	1C851050	CAP, .1M, 250V, POLYESTER FILM
C10	1C851250	CAP, .12M, 250V, POLYESTER FILM
C11	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C12	1C073310	CAP, 33M 50V ELCTLT
C14	1C851250	CAP, .12M, 250V, POLYESTER FILM
C15	1C073310	CAP, 33M 50V ELCTLT
C16	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C17	1C073310	CAP, 33M 50V ELCTLT
C18	1C073310	CAP, 33M 50V ELCTLT
C19	1C561010	CAP, CERAMIC, 1MFD 50V 10%
C21	1C671000	CAP, 10 MFD, 35V, ALUMINUM ELECTROLYTIC
C22	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C23	1C671000	CAP, 10 MFD, 35V, ALUMINUM ELECTROLYTIC
C24	1C681800	CAP, 180 MFD, 35V ALUMINUM ELECTROLYTIC
C25	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C27	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C28	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C29	1C541010	CAP, CERAMIC, .01 MFD, 50V, 10%
C30	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C31	1C561010	CAP, CERAMIC, 1MFD 50V 10%
C32	1C261020	CAP, 1M 63V FLM
C33	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C34	1C621040	CAP, 100MF, 100V ALUMINUM ELECTROLYTIC
C35	1C631000	CAP, 1000MF, 25V ALUMINUM ELECTROLYTIC, RADIAL
C36	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
CR1	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR2	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR3	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR4	1D508228	DIODE, SCHOTTKY BARRIER
CR5	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR6	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR7	1D620000	DIODE, TVS, 20V, BIDIRECTIONAL
CR8	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR9	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR10	1D620000	DIODE, TVS, 20V, BIDIRECTIONAL



CR11	1D005200	DIODE, GR 50V .050A
CR12	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR13	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR14	1D620000	DIODE, TVS, 20V, BIDIRECTIONAL
CR15	1D066200	DIODE, SW 80V .040A
CR16	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR17	1D066200	DIODE, SW 80V .040A
CR18	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR19	1D620000	DIODE, TVS, 20V, BIDIRECTIONAL
CR20	1D005200	DIODE, GR 50V .050A
CR20	1D066200	DIODE, SW 80V .040A
CR21	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR22	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR23	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
JP2	51000033	CONN, HEADER, SQ. POST, 4 POS., DUAL ROW
L01	1L000003	CHOKE, 470 MH .061 OHMS 13.5A PWR LINE
L02	1L000003	CHOKE, 470 MH .061 OHMS 13.5A PWR LINE
L02	SLE01022	ASSY, INDUCTOR, 68 uH
L03	1L000019	INDUCTOR, 220 UH @ 3.0 AMP
L03	SLE01022	ASSY, INDUCTOR, 68 uH
P01	51000041	CONN, HEADER 48 PIN PLUG, RT ANGLE
P02	51000041	CONN, HEADER 48 PIN PLUG, RT ANGLE
Q01	1T244001	XSTR HEXFET N-CHANNEL 250V 15A
Q02	1T244001	XSTR HEXFET N-CHANNEL 250V 15A
Q03	1T244001	XSTR HEXFET N-CHANNEL 250V 15A
Q04	1T250001	XSTR HEXFET N CHANNEL 200V 33A
Q05	1T250001	XSTR HEXFET N CHANNEL 200V 33A
Q06	1T250001	XSTR HEXFET N CHANNEL 200V 33A
Q07	1T250001	XSTR HEXFET N CHANNEL 200V 33A
Q08	1T014000	XSTR N-CHANNEL 100V 31A TO-247
Q09	1T221900	XSTR NPN G.P. SS TO-39
Q10	1T290500	XSTR PNP 60V .6A TO205AD
Q11	1T014000	XSTR N-CHANNEL 100V 31A TO-247
R01	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R02	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R03	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R04	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R05	1R741020	RES, 10K 1/4W 1% MF
R06	1R741020	RES, 10K 1/4W 1% MF
R07	1R741020	RES, 10K 1/4W 1% MF
R08	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R09	1R541030	RES, 10K 1/2W 5% CF
R10	1R751020	RES, 100K .25W 1% MF
R11	1R731020	RES, 1K 1/4W 1% MF
R12	1R012080	RES, 20 OHM 5W NI
R13	1R741820	RES, 18K 1/4W 1 % MF AXIAL
R14	1RV41041	POT, 10K .75W CMT
R15	1R012080	RES, 20 OHM 5W NI
R16	1R751020	RES, 100K .25W 1% MF

R17	1R713920	RES, 39 OHM 1/4W 1% METAL FILM
R18	1R741020	RES, 10K 1/4W 1% MF
R19	1R012080	RES, 20 OHM 5W NI
R20	1RV41041	POT, 10K .75W CMT
R21	1R751020	RES, 100K .25W 1% MF
R22	1R012080	RES, 20 OHM 5W NI
R23	1R741020	RES, 10K 1/4W 1% MF
R24	1R713920	RES, 39 OHM 1/4W 1% METAL FILM
R25	1R741020	RES, 10K 1/4W 1% MF
R26	1R751020	RES, 100K .25W 1% MF
R27	1R741820	RES, 18K 1/4W 1 % MF AXIAL
R28	1RV41041	POT, 10K .75W CMT
R29	1R721032	RES, 100 OHM 1/2W, 1% METAL FILM
R30	1R741020	RES, 10K 1/4W 1% MF
R31	1RV41041	POT, 10K .75W CMT
R32	1R731020	RES, 1K 1/4W 1% MF
R33	1R734720	RES, 4.75K 1/4W 1% MF
R34	1R733320	RES, 3.3K 1/4W 1% MF
R35	1R721032	RES, 100 OHM 1/2W, 1% METAL FILM
R36	1R741020	RES, 10K 1/4W 1% MF
R37	1RV41041	POT, 10K .75W CMT
R38	1RV32040	POT, 2K .75W CMT
R39	1R738220	RES, 8.2K 1/4W 1 % MF AXIAL
R40	1R731520	RES, 1.5K 1/4W 1% MF
R41	1R731020	RES, 1K 1/4W 1% MF
RT1	9T300002	THMS 1K DISC
S01	9S902004	SWITCH, SPST DIP KEYBOARD
T02	1X000038	TRANSFORMER, CURRENT SENSE ENCAPSULATED
T03	1X000038	TRANSFORMER, CURRENT SENSE ENCAPSULATED
T04	SLE67890	ASSY, RF DRIVER INPUT TRANSFORMER
T05	SLE10020	ASSY, RF DRIVER OUTPUT TRANSFORMER
U01	1U211000	IC HIGH V FET BRIDGE DVRV
U02	1U442800	IC FET DRVR 1.5A PEAK
U03	1U324000	IC QUAD OP AMP
U04	1U339000	IC LOW POWER OFFSET VOLTAGE QUAD COMPARATOR
U05	1U404300	IC QUAD NOR R-S LCH
U06	1U751000	IC, VOLT REGULATOR LOW DROPOUT 10V"
U07	1U766200	IC CMOS 8 PIN V CONV
U08	1U458400	IC HEX SCHMITT TRIGGER
U09	1U458400	IC HEX SCHMITT TRIGGER
U10	1U617200	IC, VOLTAGE FEEDBACK ADAPTER, DUAL HIGH SPEED
U11	1U257602	IC VOLT RGLTR 3A 1.23V TO 37V ADJ STEP DOWN
XQ10	9I550002	INSULATOR, MOUNTING, PAD, TO-5
XQ9	9I550002	INSULATOR, MOUNTING, PAD, TO-5
XU1	9S581009	SOCKET, IC, 14 PIN, DIP, KINKED LEAD
XU11A	9I550000	INSULATOR, TERMASIL, FOR T0-220



2.2.2 RF PA Power Supply PCB

SLP10003 RF PA Power Supply

The PA Power Supply (PAPS)

The PA Power Supply consists of three sub-sections, namely, the Inrush Current section, the DC Controller, and the DC-DC Converter. Included with these are associated signal sense and fault circuitry. Taking them one at a time in the general structure of their usage follows.

1.) The Inrush Current Section:

After receiving the HV-ON signal from the Controller / Monitor, this section switches on HV-DC and controls the charge rate of the HV DC supply capacitors to avoid damagingly high inrush currents. It does this by limiting the charge current and monitoring the voltage build-up on the large capacitor bank until it reaches an acceptable charge level, after which unlimited current is applied. The Raw HV is sampled and fed back to the Controller / Monitor.

2.) The DC Controller

This section is a buck regulator with feedback control to reduce the Raw HV DC down to level usable by the RF Power Amplifier section. Under Controller / Monitor control, the output of this section can be varied, which in turn will vary the power output of the RF Power Amplifier. The feedback allows the DC Controller to respond to the peak power demands of the PA greatly reducing or eliminating carrier droop. This section Also isolates the PA from input power fluctuations and or “brown-outs”, and maintains a steady power output over widely varying conditions. Since the DC Controller controls the RF power output and the PA sections modulator can run a constant carrier level duty cycle, power can be changed with out resetting the modulation percentage. The DC Controllers Voltage and Current output is sampled and fed back to the Controller / Monitor for monitoring. Fault conditions for current and voltage will automatically shut down the section and report to the Controller / Monitor which can attempt to bring the unit back on line if the problem was transitory or perhaps switch transmitters if the system is a dual configuration.

3.) The DC-DC Converter

The converter will take an optional 48VDC battery back-up source and produce HV which is combined with the normal AC HVDC to provide a seamless transition from AC to DC operation in the event of a Brownout or AC power failure. It is purposely set lower than the nominal AC HVDC to allow for simple diode combining and to preserve battery life while outputting a legal signal. It is NOT regulated but rather will slowly output less HV as the batteries drain. If regulated it would draw more and more current as the batteries became weaker. Since the system is computer controlled decisions can be made to stay on the air at reduced power levels in emergency situations allowing battery conservation. The Converter is a basic Chopped DC-DC converter with over-current sensing and local fault shutdown latches. The fault condition is also reported to the Controller / Monitor. A Reset of all latched fault logic states can be performed by the Controller / Monitor as necessary. A dual low voltage +12VDC supply 12VA and 12VB is fed by +50VDC derived from the AC line or 48VDC supplied by the battery backup ensuring continuous operation of the low level stages after the initial power on. The separated 12V feeds ensures minimal cross-talk between the DC-DC Controller and the DC Controller. As an aside the 50VDC supply (located elsewhere



depending on the system) is also monitored by the Controller / Monitor along with 48VDC Battery current and voltage for diagnostic information.

SECTION 2



SLP10003 -Assembly, PCB, RF PA Power Supply

<u>REFERENCE</u> <u>DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
01	SRP10003	PCB, POWER SUPPLY
010	1X000038	TRANSFORMER, CURRENT SENSE ENCAPSULATED
C01	1C073310	CAP, 33M 50V ELCTLT
C02	1C263050	CAP, 3.3M, 250V, METALLIZED FILM
C03	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C04	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C05	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C06	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C07	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C08	1C854750	CAP, .47 UF, 250V METAL POLY
C09	1C366800	CAP, 6.8M 25V TANT
C10	1C121070	CAP, 100P 500V DSM
C11	1C254710	CAP, .47M 50V METAL FILM
C12	1C261050	CAP, 1M, 250V, MF
C13	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C14	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C15	1C121070	CAP, 100P 500V DSM
C16	1C432090	CAP, .002M 1KV CER
C17	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C18	1C073310	CAP, 33M 50V ELCTLT
C19	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C20	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C21	1C073310	CAP, 33M 50V ELCTLT
C22	1C621040	CAP, 100MF, 100V ALUMINUM ELECTROLYTIC
C23	1C631010	CAP, 1000MF, 25V ALUMINUM ELECTROLYTIC
C24	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C25	1C131040	CAP 1000P 100V DSM
C26	1C621040	CAP, 100MF, 100V ALUMINUM ELECTROLYTIC
C27	1C631010	CAP, 1000MF, 25V ALUMINUM ELECTROLYTIC
C28	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C29	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C30	1C252230	CAP, .22M 80V FLM
C31	1C252230	CAP, .22M 80V FLM
C32	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C33	1C261070	CAP, 1M 400V FLM
C34	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C35	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C36	1C361000	CAP, 1M 35V TANT
C37	1C621040	CAP, 100MF, 100V ALUMINUM ELECTROLYTIC
C38	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C39	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C40	1C073310	CAP, 33M 50V ELCTLT

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SD SERIES TRANSMITTER

CR1	1D508228	DIODE, SCHOTTKY BARRIER
CR10	1D508228	DIODE, SCHOTTKY BARRIER
CR11	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR12	1D620000	DIODE, TVS, 20V, BIDIRECTIONAL
CR13	1D066200	DIODE, SW 80V .040A
CR14	1D066200	DIODE, SW 80V .040A
CR15	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR16	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR17	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR18	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR19	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR2	1D508228	DIODE, SCHOTTKY BARRIER
CR20	1D005200	DIODE, GR 50V .050A
CR21	1D060000	DIODE, HYPERFAST RECTIFYING, 600V, 8A
CR22	1D060000	DIODE, HYPERFAST RECTIFYING, 600V, 8A
CR23	1D060000	DIODE, HYPERFAST RECTIFYING, 600V, 8A
CR24	1D060000	DIODE, HYPERFAST RECTIFYING, 600V, 8A
CR25	1D005200	DIODE, GR 50V .050A
CR26	1D004000	DIODE, RECT 4A 400V 200A SURGE BRIDGE
CR27	1D400400	DIODE, RECT 400V 1A 30 DO41
CR28	1D400400	DIODE, RECT 400V 1A 30 DO41
CR29	1D400400	DIODE, RECT 400V 1A 30 DO41
CR3	1D508228	DIODE, SCHOTTKY BARRIER
CR4	1D508228	DIODE, SCHOTTKY BARRIER
CR5	1D400400	DIODE, RECT 400V 1A 30 DO41
CR6	1D508228	DIODE, SCHOTTKY BARRIER
CR7	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR8	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR9	1D620000	DIODE, TVS, 20V, BIDIRECTIONAL
DS1	9L040010	LED ASSEMBLY, W/HOUSING, RED
JP1	51000033	CONN, HEADER, SQ. POST, 4 POS., DUAL ROW
K1	9R190017	RELAY, SPDT, 12VDC, 30A, PCMT
K2	9R190017	RELAY, SPDT, 12VDC, 30A, PCMT
L1	SLE10007	ASSY, INDUCTOR 350uh (COLD FIRE)
L2	1L000019	INDUCTOR, 220 UH @ 3.0 AMP
L3	1L000019	INDUCTOR, 220 UH @ 3.0 AMP
P1	51000041	CONN, HEADER 48 PIN PLUG, RT ANGLE
P2	51000041	CONN, HEADER 48 PIN PLUG, RT ANGLE
Q01	1T405000	XSTR, SMPS MOSFET 500V
Q02	1T405000	XSTR, SMPS MOSFET 500V
Q03	1T700000	XSTR N-CHANNEL 60V 5 OHM TO-92
Q04	1T700600	XSTR, N-CHANNEL POWER MOSFET 70A, 60V .014
Q05	1T700600	XSTR, N-CHANNEL POWER MOSFET 70A, 60V .014
Q06	1T700600	XSTR, N-CHANNEL POWER MOSFET 70A, 60V .014
Q07	1T700600	XSTR, N-CHANNEL POWER MOSFET 70A, 60V .014



Q08	1T344000	XSTR NPN 250V 15MHZ TO205AD
Q09	1T344000	XSTR NPN 250V 15MHZ TO205AD
R02	1R712220	RES, 22 OHM 1/4W 1% MF
R03	1R741020	RES, 10K 1/4W 1% MF
R04	1RV41041	POT, 10K .75W CMT
R05	1R741020	RES, 10K 1/4W 1% MF
R06	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R07	1RV41041	POT, 10K .75W CMT
R08	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R09	1R741030	RES, 10K 1/2W 1% MF AXIAL
R10	1R734920	RES, 4.99K 1/4W 1% MF
R11	1R751020	RES, 100K .25W 1% MF
R12	1R741020	RES, 10K 1/4W 1% MF
R13	1R734920	RES, 4.99K 1/4W 1% MF
R14	1R731020	RES, 1K 1/4W 1% MF
R15	1RV41041	POT, 10K .75W CMT
R16	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R17	1R731020	RES, 1K 1/4W 1% MF
R18	1R741020	RES, 10K 1/4W 1% MF
R19	1R741030	RES, 10K 1/2W 1% MF AXIAL
R20	1RV32030	POT, 2K .5W CMT
R21	1R743920	RES, 39K 1/4W 1% MF
R22	1R751020	RES, 100K .25W 1% MF
R23	1R741020	RES, 10K 1/4W 1% MF
R24	1R743920	RES, 39K 1/4W 1% MF
R25	1R731020	RES, 1K 1/4W 1% MF
R26	1R741820	RES, 18K 1/4W 1 % MF AXIAL
R27	1R751020	RES, 100K .25W 1% MF
R28	1R741020	RES, 10K 1/4W 1% MF
R29	1R761020	RES, 1 MEG OHM 1/4W 1% MF
R30	1R751020	RES, 100K .25W 1% MF
R31	1R741020	RES, 10K 1/4W 1% MF
R32	1RV41041	POT, 10K .75W CMT
R33	1R751020	RES, 100K .25W 1% MF
R34	1R761020	RES, 1 MEG OHM 1/4W 1% MF
R35	1R741020	RES, 10K 1/4W 1% MF
R36	1R741020	RES, 10K 1/4W 1% MF
R37	1R741020	RES, 10K 1/4W 1% MF
R38	1RV41041	POT, 10K .75W CMT
R39	1R741820	RES, 18K 1/4W 1 % MF AXIAL
R40	1RV41041	POT, 10K .75W CMT
R41	1RV41041	POT, 10K .75W CMT
R42	1R731020	RES, 1K 1/4W 1% MF
R43	1RV32030	POT, 2K .5W CMT
R44	1R738620	RES, 8.66K 1/4W 1% MF
R45	1RV32030	POT, 2K .5W CMT
R46	1RV21080	POT, 100 OHM .5W TOP ADJUST
R47	1R741020	RES, 10K 1/4W 1% MF
R48	1RV32030	POT, 2K .5W CMT

R49	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R50	1R738620	RES, 8.66K 1/4W 1% MF
R51	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R52	1R713920	RES, 39 OHM 1/4W 1% METAL FILM
R53	1R741020	RES, 10K 1/4W 1% MF
R54	1R731520	RES, 1.5K 1/4W 1% MF
R55	1R751020	RES, 100K .25W 1% MF
R56	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R57	1RV41041	POT, 10K .75W CMT
R58	1R744720	RES, 47K 1/4W 1% MF
R59	1R741020	RES, 10K 1/4W 1% MF
R60	1R761020	RES, 1 MEG OHM 1/4W 1% MF
R61	1R741020	RES, 10K 1/4W 1% MF
R62	1R711030	RES, 10 OHM 1/2W 1% METAL FILM
R63	1R731020	RES, 1K 1/4W 1% MF
R64	1R731020	RES, 1K 1/4W 1% MF
R65	1R751020	RES, 100K .25W 1% MF
R66	1RV41041	POT, 10K .75W CMT
R67	1R713920	RES, 39 OHM 1/4W 1% METAL FILM
R69	1R4150A0	RES, 50 OHM 50W 1PCT NI
R70	1R651050	RES, 100K 1W 10 PCT CF
R71	1R731020	RES, 1K 1/4W 1% MF
R72	1R751020	RES, 100K .25W 1% MF
R73	1R751020	RES, 100K .25W 1% MF
R74	1R731020	RES, 1K 1/4W 1% MF
R75	1R741020	RES, 10K 1/4W 1% MF
R76	1R741820	RES, 18K 1/4W 1 % MF AXIAL
R77	1R733320	RES, 3.3K 1/4W 1% MF
R78	1R733320	RES, 3.3K 1/4W 1% MF
R79	1R751020	RES, 100K .25W 1% MF
R80	1R731020	RES, 1K 1/4W 1% MF
R81	1R741020	RES, 10K 1/4W 1% MF
R82	1RV41041	POT, 10K .75W CMT
S1	9S902004	SWITCH, SPST DIP KEYBOARD
S2	9S902004	SWITCH, SPST DIP KEYBOARD
S3	9S901004	SWITCH, SPDT PC
T1	1X000038	TRANSFORMER, CURRENT SENSE ENCAPSULATED
T2	1X000038	TRANSFORMER, CURRENT SENSE ENCAPSULATED
T3	SLE10008	ASSY, TRANSFORMER DC-DC (COLD FIRE)
T4	1X000038	TRANSFORMER, CURRENT SENSE ENCAPSULATED
TP0	9T200009	TEST POINT, P.C., RED
TP1	9T200009	TEST POINT, P.C., RED
TP10	9T200009	TEST POINT, P.C., RED
TP11	9T200009	TEST POINT, P.C., RED
TP12	9T200009	TEST POINT, P.C., RED
TP13	9T200009	TEST POINT, P.C., RED



TP14	9T200009	TEST POINT, P.C., RED
TP15	9T200009	TEST POINT, P.C., RED
TP16	9T200009	TEST POINT, P.C., RED
TP17	9T200009	TEST POINT, P.C., RED
TP18	9T200009	TEST POINT, P.C., RED
TP2	9T200009	TEST POINT, P.C., RED
TP3	9T200009	TEST POINT, P.C., RED
TP4	9T200009	TEST POINT, P.C., RED
TP5	9T200009	TEST POINT, P.C., RED
TP6	9T200009	TEST POINT, P.C., RED
TP7	9T200009	TEST POINT, P.C., RED
TP8	9T200009	TEST POINT, P.C., RED
TP9	9T200009	TEST POINT, P.C., RED
U01	1U324000	IC QUAD OP AMP
U02	1U211000	IC HIGH V FET BRIDGE DVRV
U03	1U408100	IC QUAD 2-INP AND
U04	1U352400	IC REGULATING PULSE-WIDTH MOD
U05	1U442800	IC FET DRVR 1.5A PEAK
U06	1U324000	IC QUAD OP AMP
U07	1U339000	IC LOW POWER OFFSET VOLTAGE QUAD COMPARATOR
U08	1U404300	IC QUAD NOR R-S LCH
U09	1U257602	IC VOLT RGLTR 3A 1.23V TO 37V ADJ STEP DOWN
U10	1U803800	IC PRECISION WAVEFORM GENERATOR
U11	1U257602	IC VOLT RGLTR 3A 1.23V TO 37V ADJ STEP DOWN
U12	1U408201	IC FET DRIVER H-BRIDGE 80V 1.25A PEAK"
U13	1U408100	IC QUAD 2-INP AND
U14	1U442800	IC FET DRVR 1.5A PEAK
U15	1U339000	IC LOW POWER OFFSET VOLTAGE QUAD COMPARATOR
U16	1U404300	IC QUAD NOR R-S LCH
U17	1U324000	IC QUAD OP AMP
U18	1U339000	IC LOW POWER OFFSET VOLTAGE QUAD COMPARATOR

2.2.3 Analog I/O and Audio PCB

SLP10005 Analog I/O

The Analog I/O and PWM PCB consists of several sub sections which accomplish the following functions:

Analog Signal Input
Analog Signal Output
Modulation Detection

The Analog Input Section is essentially a 40 channel low pass filtered analog MUX. These multiplexed inputs are actually an expansion scheme which adds additional analog inputs to those already available to the controller/ monitor. This allows the overall system to be expanded to control larger multi-section transmitters up to 1KW at present.

Signals such as RF Power Amplifier voltage, current and temperature, to name only a few, are sampled and read in to the Controller / Monitor via this MUX. The multiplexing process is directly controlled by the Controller Monitor.

The Analog Signal Output Section is a smaller MUX facilitating output control expansion. As an example, an analog control signal originating in the Controller / Monitor such as PWR_LEVEL (a 0.0 to 4.0 volt DC level) is sent to this Sample and Hold MUX channel 1. Via this channel the MUX outputs this particular level to the PA Power Supply which dictates the output power level of the transmitter. The Next Channel of the MUX can control yet another module requiring some level of control voltage if needed.

The Modulation Detector receives a detected sample of the RF envelope form the bridge circuit and converts it into two DC levels called Vmax and Vgref. The Controller / Monitor reads in these levels and subtracts Vgref from Vmax to derive Vmin. Vmax and Vmin are then used in the standard modulation formula to obtain modulation percentage in the same way as someone would calculate it manually using an oscilloscope. This circuit is intended to free the Controller / Monitor from having to sample large amounts of envelope data to statistically calculate the percentage thereby facilitating more of a real-time monitoring of modulation. Correction curves are embedded to resolve linearity issues arising from the detection process.



SLP10005 - Assembly, Analog I/O and Audio

<u>REFERENCE</u> <u>DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
C1	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C10	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C11	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C12	6C441010	CAP, 1206, .01 M, 50V, CERAMIC CHIP
C13	6C4068A0	CAP, 1206, 6.8UF, 10V, CERAMIC CHIP
C14	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C15	6C4068A0	CAP, 1206, 6.8UF, 10V, CERAMIC CHIP
C16	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C17	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C18	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C19	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C2	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C20	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C21	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C22	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C23	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C24	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C25	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C26	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C27	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C28	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C29	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C3	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C30	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C31	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C32	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C33	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C34	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C35	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C36	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C37	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C38	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C39	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C4	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C40	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C41	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C42	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C43	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C44	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C45	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C46	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C47	6C410000	CAP, 1206 1.0UF, 25V CERAMIC

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C48	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C49	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C5	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C50	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C51	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C52	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C53	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C54	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C55	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C56	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C57	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C58	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C59	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C6	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C60	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C61	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C62	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C63	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C64	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C65	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C66	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C67	1C253310	CAP, .33M, 50V MF
C68	1C254710	CAP, .47M 50V METAL FILM
C69	1C253910	CAP, .0039 50V MF
C7	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C70	1C251510	CAP, .15 50V MF
C71	1C241010	CAP, .01M 50V FLM
C77	6C310000	CAP, 10UF 25V TANTALUM CHIP
C78	6C310000	CAP, 10UF 25V TANTALUM CHIP
C79	6C428210	CAP, 1206, 820PF 50V CERAMIC CHIP
C8	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C80	6C428210	CAP, 1206, 820PF 50V CERAMIC CHIP
C81	6C310000	CAP, 10UF 25V TANTALUM CHIP
C82	6C431010	CAP, 1206, 1000 PF, 50V, CERAMIC CHIP
C83	6C431010	CAP, 1206, 1000 PF, 50V, CERAMIC CHIP
C84	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C85	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C86	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C87	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C88	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C89	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C9	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C90	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C91	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C92	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C93	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C94	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C95	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
CR1	1D508228	DIODE, SCHOTTKY BARRIER



CR2	1D066200	DIODE, SW 80V .040A
CR3	1D508228	DIODE, SCHOTTKY BARRIER
JP1	51000032	CONN., HEADER, 2 POS. .100 x.100 CENTERS
JP2	51000033	CONN, HEADER, SQ. POST, 4 POS., DUAL ROW
P1	55000000	CONN, DIN, R.A. HEADER, 96 POS. PLUG
Q1	1T700000	XSTR N-CHANNEL 60V 5 OHM TO-92
Q2	1T700000	XSTR N-CHANNEL 60V 5 OHM TO-92
R1	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R10	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R100	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R101	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R102	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R103	1RV41031	POT, 10K .5W SIDE ADJ
R11	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R12	1R751020	RES, 100K .25W 1% MF
R13	1R748820	RES, 88.7K 1/4W 1% MF
R14	1R747520	RES, 75K 1/4W 1% MF
R15	1R746120	RES, 61.9K .25W 1% MF
R16	1R744820	RES, 48.7K 1/4W 1% MF
R17	1R743520	RES, 35.7K 1/4W 1% MF
R18	1R742320	RES, 23.2K 1/4W 1% MF
R19	1R741020	RES, 10K 1/4W 1% MF
R2	1RV41031	POT, 10K .5W SIDE ADJ
R20	6R231020	RES, 1206, 10M 1/4W 5% THICK FILM
R21	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R22	6R251010	RES., 1206, 100K, 1/8W, 5% THICK FILM CHIP
R23	6R251010	RES., 1206, 100K, 1/8W, 5% THICK FILM CHIP
R24	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R25	6R241820	RES, 1206, 18K 1/4W THICK FILM
R26	6R241820	RES, 1206, 18K 1/4W THICK FILM
R27	6R241820	RES, 1206, 18K 1/4W THICK FILM
R28	6R241820	RES, 1206, 18K 1/4W THICK FILM
R29	6R241820	RES, 1206, 18K 1/4W THICK FILM
R3	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R30	6R241820	RES, 1206, 18K 1/4W THICK FILM
R31	6R241820	RES, 1206, 18K 1/4W THICK FILM
R32	6R241820	RES, 1206, 18K 1/4W THICK FILM
R33	6R241820	RES, 1206, 18K 1/4W THICK FILM
R34	6R241820	RES, 1206, 18K 1/4W THICK FILM
R35	6R241820	RES, 1206, 18K 1/4W THICK FILM
R36	6R241820	RES, 1206, 18K 1/4W THICK FILM
R37	6R241820	RES, 1206, 18K 1/4W THICK FILM
R38	6R241820	RES, 1206, 18K 1/4W THICK FILM
R39	6R241820	RES, 1206, 18K 1/4W THICK FILM
R4	6R231020	RES, 1206, 10M 1/4W 5% THICK FILM
R40	6R241820	RES, 1206, 18K 1/4W THICK FILM
R41	6R241820	RES, 1206, 18K 1/4W THICK FILM
R42	6R241820	RES, 1206, 18K 1/4W THICK FILM
R43	6R241820	RES, 1206, 18K 1/4W THICK FILM

R44	6R241820	RES, 1206, 18K 1/4W THICK FILM
R45	6R241820	RES, 1206, 18K 1/4W THICK FILM
R46	6R241820	RES, 1206, 18K 1/4W THICK FILM
R47	6R241820	RES, 1206, 18K 1/4W THICK FILM
R48	6R241820	RES, 1206, 18K 1/4W THICK FILM
R49	6R241820	RES, 1206, 18K 1/4W THICK FILM
R5	6R251010	RES., 1206, 100K, 1/8W, 5% THICK FILM CHIP
R50	6R241820	RES, 1206, 18K 1/4W THICK FILM
R51	6R241820	RES, 1206, 18K 1/4W THICK FILM
R52	6R241820	RES, 1206, 18K 1/4W THICK FILM
R53	6R241820	RES, 1206, 18K 1/4W THICK FILM
R54	6R241820	RES, 1206, 18K 1/4W THICK FILM
R55	6R241820	RES, 1206, 18K 1/4W THICK FILM
R56	6R241820	RES, 1206, 18K 1/4W THICK FILM
R57	6R241820	RES, 1206, 18K 1/4W THICK FILM
R58	6R241820	RES, 1206, 18K 1/4W THICK FILM
R59	6R241820	RES, 1206, 18K 1/4W THICK FILM
R6	6R251020	RES, 1206, 1M 1/4W 5% THICK FILM
R60	6R241820	RES, 1206, 18K 1/4W THICK FILM
R61	6R241820	RES, 1206, 18K 1/4W THICK FILM
R62	6R241820	RES, 1206, 18K 1/4W THICK FILM
R63	1R732010	RES, 2K 1/8W 1% MF
R64	1R732010	RES, 2K 1/8W 1% MF
R65	1R732010	RES, 2K 1/8W 1% MF
R66	1R732010	RES, 2K 1/8W 1% MF
R67	1R732010	RES, 2K 1/8W 1% MF
R68	1R754520	RES, 453 OHM 1/4W 1% MF
R69	1R756020	RES, 604 OHM 1/4W 1% MF
R7	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R70	1R745620	RES, 56.2K 1/4W 1% MF
R71	1R731320	RES, 1.33K 1/4W 1% MF
R72	1R742121	RES, 21K 1/4W 1% MF
R73	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R74	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R75	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R76	6R126120	RES, 1206, 619 OHM 1/4W 1%
R77	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R78	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R79	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R8	1RV41031	POT, 10K .5W SIDE ADJ
R80	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R81	6R129020	RES, 1206, 9.09K 1/4W 1%
R82	6R144720	RES, 1206, 47.0K, 1/4W 1%
R83	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R84	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R85	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R86	6R144720	RES, 1206, 47.0K, 1/4W 1%
R87	1RV32032	POT, 2K, 5W SIDE ADJ
R88	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM



R89	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R9	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R90	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R91	1RV41031	POT, 10K .5W SIDE ADJ
R92	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R93	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R94	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R95	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R96	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R97	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R98	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R99	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
TP1	9T200009	TEST POINT, P.C., RED
U1	6U711000	IC, CMOS LOW VOLATAGE QUAD SWITCH
U10	6U711000	IC, CMOS LOW VOLATAGE QUAD SWITCH
U11	6U139000	ID, DUAL 2 TO 4 DECODERS/DEMULTIPIEXERS
U12	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U13	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U14	6U508000	IC, CHANNEL 8 TO 1 ANALOG MULTIPLEXER
U15	6U080000	IC, OCTAL SAMPLE AND HOLD WITH MULTIPLEXED INPUT
U16	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U17	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U18	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U19	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U2	6U711000	IC, CMOS LOW VOLATAGE QUAD SWITCH
U20	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U21	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U22	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U23	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U24	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U25	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U26	6U224000	IC, QUADRUPLE OPERATIONAL AMPLIFIERS
U27	1U553200	IC DUAL LOW-NOISE OP AMP
U28	1U553200	IC DUAL LOW-NOISE OP AMP
U29	1U553200	IC DUAL LOW-NOISE OP AMP
U3	6U711000	IC, CMOS LOW VOLATAGE QUAD SWITCH
U4	6U711000	IC, CMOS LOW VOLATAGE QUAD SWITCH
U5	6U711000	IC, CMOS LOW VOLATAGE QUAD SWITCH
U6	6U711000	IC, CMOS LOW VOLATAGE QUAD SWITCH
U7	6U711000	IC, CMOS LOW VOLATAGE QUAD SWITCH
U8	6U711000	IC, CMOS LOW VOLATAGE QUAD SWITCH
U9	6U711000	IC, CMOS LOW VOLATAGE QUAD SWITCH

2.2.4 Controller / Monitor PCB

SLP10007 – Controller / Monitor

The **CONTROLLER/ MONITOR** employs the new Motorola MCF5206 COLDFIRE® microprocessor. It encompasses the following sections:

1. COLDFIRE Processor – 32-bit
2. ADC – 8-Channel 12-bit
3. DAC – 8-Channel 8-bit
4. DDS - Radio Frequency (190K to 1800KHz)
5. DDS – Tone Frequency (400 / 1020 Hz)
6. Flash Memory – 4Mb
7. DRAM – 16Mb
8. Programmable Logic
9. Digital I/O (Read/Write)
10. UART
11. Watch Timer and NV-RAM

² COLDFIRE Processor section:

The LOGIC program creates 16MHz from 32MHz for the clock frequency of the microprocessor. The processor controls several peripheral functions such as memory, task timers, I/O bus lines, and RS-232 ports. For the dual system, the primary Controller / Monitor and secondary Controller / Monitor may talk to each other through Controller / Monitor Motherboard (SLP10012) by using 2 COM-PORT lines (ex: RXD & TXD). Each Controller / Monitor has one interrupt line for paying attention what other Controller / Monitor has something is important, then Controller / Monitor sets “RS-232” MUX to be enabled.

² Analog-to-Digital converter (ADC) section:

The Controller / Monitor Controller PCB has two (AD7891) 12-bit ADC chips, so there are 16 analog inputs. The channel selection of input range is 0 to +5 V.

² Digital-to-Analog Converter (DAC) section:

The 8-bit DAC provides eight digitally controlled dc voltage outputs. The limited of output range is 0 to +5 V. The user may adjust dc analog level or turn on/off likely digital level.

² RF Direct Digital Synthesizer (DDS) section:

The 50MHz clock input is for the RF DDS. The RF DDS provides two different signal-waves (square wave and sine wave). The square wave level is 0 to +5.0 V (recommended) and the sine wave level is 0 to 1.0 V. The DDS has 8 data digitally



inputs. The code may store 4 data bytes for the 32-bit RF DDS tuning word. RF is enabled by writing the desired frequency to the DDS, and disabled by writing a zero frequency to the DDS. The RF DDS goes the signal through EMI filter to generate a low jitter square wave output.

² Tone Frequency Direct Digital Synthesizer section:

The 50MHz clock input is also used by the AF DDS. The AF DDS signal is sine wave only. The user may adjust AF amplitude modulation. Two methods for keying the tone are available. The first is like the RF DDS - load a frequency into the registers of the DDS chip. The second is simply “keying” (digital ON/OFF) of a reserved I/O signal. The settings for ID mode, ID code, ID rate, sequence of operation and other parameters are set by a user interface program.

² Flash Memory section:

Its 4Mb of memory is organized as 512K x 8. The firmware for the E(E)PROM is written in assembly / C code. It may move data to DRAM and NV-RAM memory when the power is up. It is simple to replace when the code is updated.

² DRAM section:

The PCB has two DRAM devices. It totals 1Mb x 16 x 2 (32-bit data). During initialization the EPROM moves data to the DRAM.

² Programmable LOGIC (LATTICE device) section:

There are two LATTICE chips on the PCB. The Programmable Logic provides several necessary functions such as control lines, 1Hz, 16MHz, enabled / disabled lines and interrupt lines.

² Digital I/O section:

There are 32 digital inputs or outputs and 4 control lines for writing. Each control has 8 data lines organized as one byte each. They are used for the status fault, frequency reading, reset, and control data.

² Universal Synchronous/Asynchronous Receiver/Transmitters (UART) section:

The Controller / Monitor processor has two UARTs. They are used for RS-232 only. SAC offers four possible transmitter configurations as follows:

B) Single TX **without** a LOCAL CONTROL panel:

The Controller / Monitor serial port 1 is probably used for PC.

The Controller / Monitor serial port 2 is used for PC / Modem through Controller / Monitor Motherboard (Controller / Monitor MB – SLP10012).

C) Single TX **with** a LOCAL CONTROL panel:

The Controller / Monitor serial port 1 is used for the local operating panel.

The Controller / Monitor serial port 2 is used for PC / Modem through Controller / Monitor MB.

D) Dual TX **without** a LOCAL CONTROL panel:

Either Controller / Monitor1 or Controller / Monitor2 serial port 1 is probably used for PC.

The serial port 2 is used for PC / Modem through Controller / Monitor MB.

E) Dual TX **with** a LOCAL CONTROL panel:

Either Controller / Monitor1 or Controller / Monitor2 serial port 1 is used for local operating panel.

The serial port 2 is used for PC / Modem through Controller / Monitor MB.

² Watch Timer and NV-RAM section:

The NV-RAM provides 32Kb of memory available to the user. The NV-RAM can hold data more than 10 years in the absence of power. It allows the operator to store various settings in NV memory. When the power is up, Controller / Monitor can follow the user settings in NV memory. The Watchdog timer restarts an out of control Controller / Monitor processor. The code may use the real-time clock for 255 task timers (background).



SLP10007 - Assembly, PCB, Controller / Monitor

<u>REFERENCE</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
<u>DESIGNATOR</u>		
	SLG10001	ASSY, EPROM, CF PROCESSOR SOFTWARE
C1	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C10	6C441010	CAP, 1206, .01 M, 50V, CERAMIC CHIP
C11	6C441010	CAP, 1206, .01 M, 50V, CERAMIC CHIP
C12	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C13	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C14	6C412240	CAP, 1206, 22PF, 100V, CERAMIC CHIP
C16	6C413340	CAP, 1206, 33PF, 100V, CERAMIC CHIP
C19	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C2	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C20	6C412240	CAP, 1206, 22PF, 100V, CERAMIC CHIP
C21	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C22	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C23	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C24	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C25	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C26	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C27	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C28	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C29	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C3	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C30	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C31	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C32	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C33	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C34	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C35	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C36	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C37	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C38	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C39	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C4	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C40	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C41	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C42	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C43	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C44	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C45	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C46	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C47	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C48	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C49	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C5	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP

SOUTHERN AVIONICS COMPANY

SD SERIES TRANSMITTER

**SECTION 2**

C50	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C51	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C52	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C53	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C54	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C55	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C56	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C57	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C58	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C59	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C6	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C60	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C61	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C62	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C63	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C64	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C65	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C66	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C67	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C68	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C69	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C7	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C70	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C71	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C72	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C73	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C74	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C75	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C76	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C8	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C9	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
JP1	51000026	CONN., HEADER, SQUARE POST, 3 POS. SINGLE ROW
P1	51000014	CONN, HEADER, SQ. POST, 8 POS., SINGLE ROW
P2	51000030	CONN., HEADER, BREAKAWAY, 10 POS DUAL ROW
P4	55000000	CONN, DIN, R.A. HEADER, 96 POS. PLUG
P5	51000016	CONN, R.A. HEADER, D-SUB, 9 PIN
P6	51000016	CONN, R.A. HEADER, D-SUB, 9 PIN
R1	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R10	6R222010	RES., 1206 200 OHM 1/4W, 5% THICK FILM CHIP
R11	6R251010	RES., 1206, 100K, 1/8W, 5% THICK FILM CHIP
R12	6R221010	RES., 1206, 100 OHM, 1/4W, 5% THICK FILM CHIP
R13	6R251010	RES., 1206, 100K, 1/8W, 5% THICK FILM CHIP
R14	6R221010	RES., 1206, 100 OHM, 1/4W, 5% THICK FILM CHIP
R15	6R222010	RES., 1206 200 OHM 1/4W, 5% THICK FILM CHIP
R16	6R233910	RES., 1206, 3.9K, 1/4W, 5% THICK FILM CHIP
R17	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R18	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP

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R19	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R2	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R3	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R4	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R5	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R6	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R7	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R8	6R215110	RES., 51 OHM, 1/4W, 5% THICK FILM CHIP
R9	6R215110	RES., 51 OHM, 1/4W, 5% THICK FILM CHIP
RP1	1RS31020	RES, NETWORK SIP 1K .20W
U1	6U021300	IC, SINGLE SUPPLY DUAL OP AMP
U10	6U021300	IC, SINGLE SUPPLY DUAL OP AMP
U11	6U021300	IC, SINGLE SUPPLY DUAL OP AMP
U12	6U021300	IC, SINGLE SUPPLY DUAL OP AMP
U13	6U021300	IC, SINGLE SUPPLY DUAL OP AMP
U14	6YD50000	CRYSTAL, 50 MHZ HIGH FREQUENCY, SG-615 SERIES
U15	6U983000	IC, CMOS, DDS, NUMERICALLY CONTROLLED OSCILLATOR
U16	6U985000	IC, CMOS 125 MHZ DDS SYNTHESIZER
U17	9F347000	FILTER, EMI COIL TYPE 470PF
U19	6U520600	IC, COLD FIRE MICROPROCESSOR
U2	6U789100	IC, 12 BIT HIGH SPEED DATA ACQUISITION
U20	1U290400	IC, 512K X 8 CMOS FLASH MEMORY
U21	1U138601	IC, TIMEKEEPER RAMIFIED WATCHDOG 32K-120
U22	6U020800	IC, CMOS RS-232 DRIVER/RECEIVER
U23	6U456401	IC, PROGRAMMABLE, 44 PIN TQFP
U24	6U411601	IC, 1 MEG X 16 EXTENDED DATA OUT DRUM
U25	6U456401	IC, PROGRAMMABLE, 44 PIN TQFP
U26	6U411601	IC, 1 MEG X 16 EXTENDED DATA OUT DRUM
U27	6YC10000	CRYSTAL, 32 MHZ SURFACE MOUNT KFO SERIES
U28	6U070800	IC, LOW COST MP SUPERVISORY CIRCUIT
U29	6U057300	IC, OCTAL TRANSPARENT D-TYPE LATCH
U3	6U021300	IC, SINGLE SUPPLY DUAL OP AMP
U30	6U057300	IC, OCTAL TRANSPARENT D-TYPE LATCH
U31	6U057300	IC, OCTAL TRANSPARENT D-TYPE LATCH
U32	6U057300	IC, OCTAL TRANSPARENT D-TYPE LATCH
U33	6U057300	IC, OCTAL TRANSPARENT D-TYPE LATCH
U34	6U057300	IC, OCTAL TRANSPARENT D-TYPE LATCH
U35	6U057300	IC, OCTAL TRANSPARENT D-TYPE LATCH
U36	6U057300	IC, OCTAL TRANSPARENT D-TYPE LATCH
U37	6U509000	IC, CHANNEL ANALOG MULTIPLEXER
U38	6U745740	IC, OCTAL EDGE TRIGGERED D-TYPE FLIP FLOP
U4	6U021300	IC, SINGLE SUPPLY DUAL OP AMP
U5	6U019500	IC, VOLTAGE REFERENCE
U6	6U021300	IC, SINGLE SUPPLY DUAL OP AMP
U7	6U880300	IC, OCTAL 8 BIT TRIMDAC
U8	6U021300	IC, SINGLE SUPPLY DUAL OP AMP



U9

6U789100

IC, 12 BIT IGH SPEED DATA ACQUISITION

SECTION 2

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SD SERIES TRANSMITTER

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2.2.4 Digital I/O and PWM PCB

SLP10009 Digital I/O and PWM Theory

The Digital I/O and PWM PCB consists of several sub sections which accomplish the following functions:

- Digital Input State Reading
- Digital Output Control
- Frequency Counting
- Audio to PWM Conversion
- AWOS Option.

The Digital Input Section receives and conditions state information from the various system modules mainly indicating the fault status of these sections but also monitoring the state of other sensors. While retaining their unique state value all of these signals are combined into one interrupt request (IRQ) line for rapid servicing of external events. A local red fault LED indicates the arrival of a fault condition. The processor take action depending on the nature of the condition.

The Digital Output Section conditions and outputs a state condition to the various system modules primarily to perform fault resets. Antenna switching is also controlled by this section.

The Frequency Counter section conditions and samples the Direct Digital Synthesizer generated frequency from the RF power amplifier. This data is relayed to the processor which monitors the output RF frequency for accuracy.

The PWM section of this board inputs audio signals from the tone generating Direct Digital Synthesizer and from an optional voice input piggybacked PCB for AWOS functionality. The composite audio signal is summed with an adjustable DC level and converted into a 75 kHz Pulse Width Modulated signal with its basic no-audio duty cycle being set at a fixed percentage. This fixed level facilitates modulation tracking irregardless of power level output. A back-up modulation limiting circuit prevents over-modulation from damaging the RF Amplifier but main over modulation protection control for Tone signals is a software function of the processor which monitors modulation at all times.

The Optional AWOS plug in PCB Contains an AGC section which prevents over-modulation by the USER audio signal. There is also a built in active Audio band-pass filter which eliminates signals outside of the 300 to 3000Hz pass band. Signals generated on this Optional PCB also alert the processor which then cuts the main tone level and temporarily ceases issuing any modulation alarms based on modulation percentage.

SLP10009 - Assembly, PCB, Digital I/O and PWM

<u>REFERENCE</u> <u>DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
05	9P100000	PIN, MOUNTING
C1	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C10	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C11	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C12	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C13	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C14	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C15	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C17	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C18	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C19	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C2	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C20	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C21	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C22	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C23	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C24	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C25	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C26	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C27	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C28	1C131040	CAP 1000P 100V DSM
C29	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C3	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C30	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C31	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C32	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C33	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C34	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C35	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C36	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C4	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C5	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C6	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C7	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C8	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C9	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
CR1	1D508228	DIODE, SCHOTTKY BARRIER
DS1	9L040012	LED ASSEMBLY, W / HOUSING GREEN
DS2	9L040012	LED ASSEMBLY, W / HOUSING GREEN
DS3	9L040010	LED ASSEMBLY, W/HOUSING, RED
P1	51000030	CONN., HEADER, BREAKAWAY, 10 POS DUAL ROW
P2	55000000	CONN, DIN, R.A. HEADER, 96 POS. PLUG



R1	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R10	6R233910	RES., 1206, 3.9K, 1/4W, 5% THICK FILM CHIP
R11	1RV31031	POT, 1K 5W SIDE ADJ
R12	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R13	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R14	6R222010	RES., 1206 200 OHM 1/4W, 5% THICK FILM CHIP
R15	6R222010	RES., 1206 200 OHM 1/4W, 5% THICK FILM CHIP
R2	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R3	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R4	1RV31031	POT, 1K 5W SIDE ADJ
R5	1R625650	RES, 560 OHM 1W 10 PCT CF
R6	6R221010	RES., 1206, 100 OHM, 1/4W, 5% THICK FILM CHIP
R7	6R233910	RES., 1206, 3.9K, 1/4W, 5% THICK FILM CHIP
R8	6R221010	RES., 1206, 100 OHM, 1/4W, 5% THICK FILM CHIP
R9	1R748220	RES, 82.5K 1/4W 1% MF
RP1	1RS31020	RES, NETWORK SIP 1K .20W
RP2	1RS31020	RES, NETWORK SIP 1K .20W
RP3	1RS31020	RES, NETWORK SIP 1K .20W
TP1	9T200009	TEST POINT, P.C., RED
TP2	9T200009	TEST POINT, P.C., RED
TP3	9T200009	TEST POINT, P.C., RED
U1	6U450400	IC, CMOS HEX VOLTAGE LEVEL SHIFTER
U10	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U11	6U407500	IC, GATE 3 INPUT
U12	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U13	6U407500	IC, GATE 3 INPUT
U14	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U15	6U407500	IC, GATE 3 INPUT
U16	6U450400	IC, CMOS HEX VOLTAGE LEVEL SHIFTER
U17	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U18	6U450400	IC, CMOS HEX VOLTAGE LEVEL SHIFTER
U19	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U2	6U740400	IC, CMOS HIGH SPEED LOGIC HEX INVERTER
U20	6U450400	IC, CMOS HEX VOLTAGE LEVEL SHIFTER
U21	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U22	6U450400	IC, CMOS HEX VOLTAGE LEVEL SHIFTER
U23	6U456401	IC, PROGRAMMABLE, 44 PIN TQFP
U24	6U442800	IC, DUAL POWER MOSFET
U25	1U803800	IC PRECISION WAVEFORM GENERATOR
U26	6U219000	IC, HIGH SPEED DUAL COMPARATOR
U27	1U553200	IC DUAL LOW-NOISE OP AMP
U3	6U450400	IC, CMOS HEX VOLTAGE LEVEL SHIFTER
U4	6U740400	IC, CMOS HIGH SPEED LOGIC HEX INVERTER
U5	6U450400	IC, CMOS HEX VOLTAGE LEVEL SHIFTER
U6	6U740400	IC, CMOS HIGH SPEED LOGIC HEX INVERTER
U7	6U450400	IC, CMOS HEX VOLTAGE LEVEL SHIFTER
U8	6U740400	IC, CMOS HIGH SPEED LOGIC HEX INVERTER
U9	6U407500	IC, GATE 3 INPUT



2.3 Detailed Circuit Analysis: Dual Transmitter

Detailed circuit Analysis in this location.

2.3.1 SLP10012 - Controller Motherboard

Here will be a written description of the functionality of the ColdFire Motherboard.



SLP10012 - Assembly, PCB, Controller Motherboard

<u>REFERENCE</u> <u>DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
01	SRP10012	PCB, CF MOTHERBOARD
C01	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C02	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
J01	51000019	CONN., HEADER, .025 SQ. POSTS, 14 PIN
J02	51000019	CONN., HEADER, .025 SQ. POSTS, 14 PIN
J03	51000019	CONN., HEADER, .025 SQ. POSTS, 14 PIN
J04	51000019	CONN., HEADER, .025 SQ. POSTS, 14 PIN
J05	51000019	CONN., HEADER, .025 SQ. POSTS, 14 PIN
J06	51000019	CONN., HEADER, .025 SQ. POSTS, 14 PIN
J07	51000019	CONN., HEADER, .025 SQ. POSTS, 14 PIN
J08	51000019	CONN., HEADER, .025 SQ. POSTS, 14 PIN
J09	51000018	CONN., HEADER, .025 SQ. POSTS, 10 PIN
J10	51000018	CONN., HEADER, .025 SQ. POSTS, 10 PIN
J11	51000020	CONN., HEADER, .025 SQ. POSTS, 20 PIN
J12	51000020	CONN., HEADER, .025 SQ. POSTS, 20 PIN
J13	51000021	CONN, HEADER, .025 SQ. POSTS, 26 PIN
J20	51000042	CONN, BREAKAWAY HEADER 156 CENTER 8 POS
JP1	51000026	CONN., HEADER, SQUARE POST, 3 POS. SINGLE ROW
JP2	51000026	CONN., HEADER, SQUARE POST, 3 POS. SINGLE ROW
JP3	51000026	CONN., HEADER, SQUARE POST, 3 POS. SINGLE ROW
TB01A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB01B	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB01C	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB02A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB02B	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB02C	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB03	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB04	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB05	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB06	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB10A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB10B	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB10C	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB11	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB12	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB13A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB13B	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB14A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB14B	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB15	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB16	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB7A	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB7B	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB8A	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB8B	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB9A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB9B	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT

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TB9C	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
U1	1U050900	IC DUAL 4-T0-1 ANALOG MULTIPLEXER
XA10	55000001	CONN, DIN, PCB HEADER, 96 POS. RECPT.
XA3	55000001	CONN, DIN, PCB HEADER, 96 POS. RECPT.
XA4	55000001	CONN, DIN, PCB HEADER, 96 POS. RECPT.
XA5	55000001	CONN, DIN, PCB HEADER, 96 POS. RECPT.
XA6	55000001	CONN, DIN, PCB HEADER, 96 POS. RECPT.
XA7	55000001	CONN, DIN, PCB HEADER, 96 POS. RECPT.
XA8	55000001	CONN, DIN, PCB HEADER, 96 POS. RECPT.
XA9	55000001	CONN, DIN, PCB HEADER, 96 POS. RECPT.
XJ01A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ01B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ02A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ02B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ03A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ03B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ04A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ04B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ05A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ05B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ06A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ06B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ07A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ07B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ08A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ08B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ09A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ09B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ10A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ10B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ11A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ11B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ12A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ12B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ13A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ13B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJP1	9S320001	SHUNT STAND PROFILE GOLD
XJP2	9S320001	SHUNT STAND PROFILE GOLD
XJP3	9S320001	SHUNT STAND PROFILE GOLD



2.3.2 Dual Low Voltage Power Supply PCB

SLP10017 Low Voltage Power Supply

The LVPS Furnishes +5, +12, and -12VDC to the Controller/ Monitor Mother Board and itself plugs into the mother PCB. It is transformer driven to allow for 115/230VAC operation. 48VDC operation allows running off of emergency battery. The LVPS also passes 50VDC or 48V BATTERY to the user section to power miscellaneous circuitry.

SLP10017 - Assembly, Low voltage Power Supply (Coldfire)

<u>REFERENCE</u> <u>DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
C1	1C621040	CAP, 100MF, 100V ALUMINUM ELECTROLYTIC
C2	1C631010	CAP, 1000MF, 25V ALUMINUM ELECTROLYTIC
C3	1C631040	CAP, 1000MF 100V ALUMINUM ELECTROLYTIC
C4	1C621040	CAP, 100MF, 100V ALUMINUM ELECTROLYTIC
C5	1C631010	CAP, 1000MF, 25V ALUMINUM ELECTROLYTIC
C6	1C681800	CAP, 180 MFD, 35V ALUMINUM ELECTROLYTIC
C7	1C631010	CAP, 1000MF, 25V ALUMINUM ELECTROLYTIC
C8	1C621040	CAP, 100MF, 100V ALUMINUM ELECTROLYTIC
C9	1C631010	CAP, 1000MF, 25V ALUMINUM ELECTROLYTIC
CR1	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR2	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR3	1D440000	DIODE, RECT 4A 400V 200A SURGE BRIDGE
CR4	1D004000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR5	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR6	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR7	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR8	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR9	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR10	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
CR11	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
F1	9F830020	FUSE, 2 AMP, 250V, 3AG (AGC) FAST ACTING TYPE
L1	1L000019	INDUCTOR, 220 UH @ 3.0 AMP
L2	1L000019	INDUCTOR, 220 UH @ 3.0 AMP
L3	1L000019	INDUCTOR, 220 UH @ 3.0 AMP
L4	1L000019	INDUCTOR, 220 UH @ 3.0 AMP
R1	1RV32032	POT, 2K 5W SIDE ADJUST
R2	1R633320	RES, 3.3K .25W 10 PCT CF
R3	1RV32032	POT, 2K 5W SIDE ADJUST
R4	1R638220	RES, 8.2K .25W 10 PCT CF
R5	1RV32032	POT, 2K 5W SIDE ADJUST
R6	1R638220	RES, 8.2K .25W 10 PCT CF
P1	55000000	CONN, HDR 96 PIN RIGHT ANGLE
T1	1X000039	TRANSFORMER, 63VA TOROID
TP0	9T200009	TEST POINT, P.C., RED
TP1	9T200009	TEST POINT, P.C., RED
TP2	9T200009	TEST POINT, P.C., RED
TP3	9T200009	TEST POINT, P.C., RED
U1	1U257602	IC VOLT RGLTR 3A 1.23V TO 37V ADJ STEP DOWN
U2	1U257602	IC VOLT RGLTR 3A 1.23V TO 37V ADJ STEP DOWN



U3	1U257600	IC VOLT RGLTR 3A 12V STEP DOWN
U4	1U257602	IC VOLT RGLTR 3A 1.23V TO 37V ADJ STEP DOWN
XF1	9F831000	FUSECLIP PC MT
XF2	9F831000	FUSECLIP PC MT

2.3.3 RF MOTHERBOARD PCB

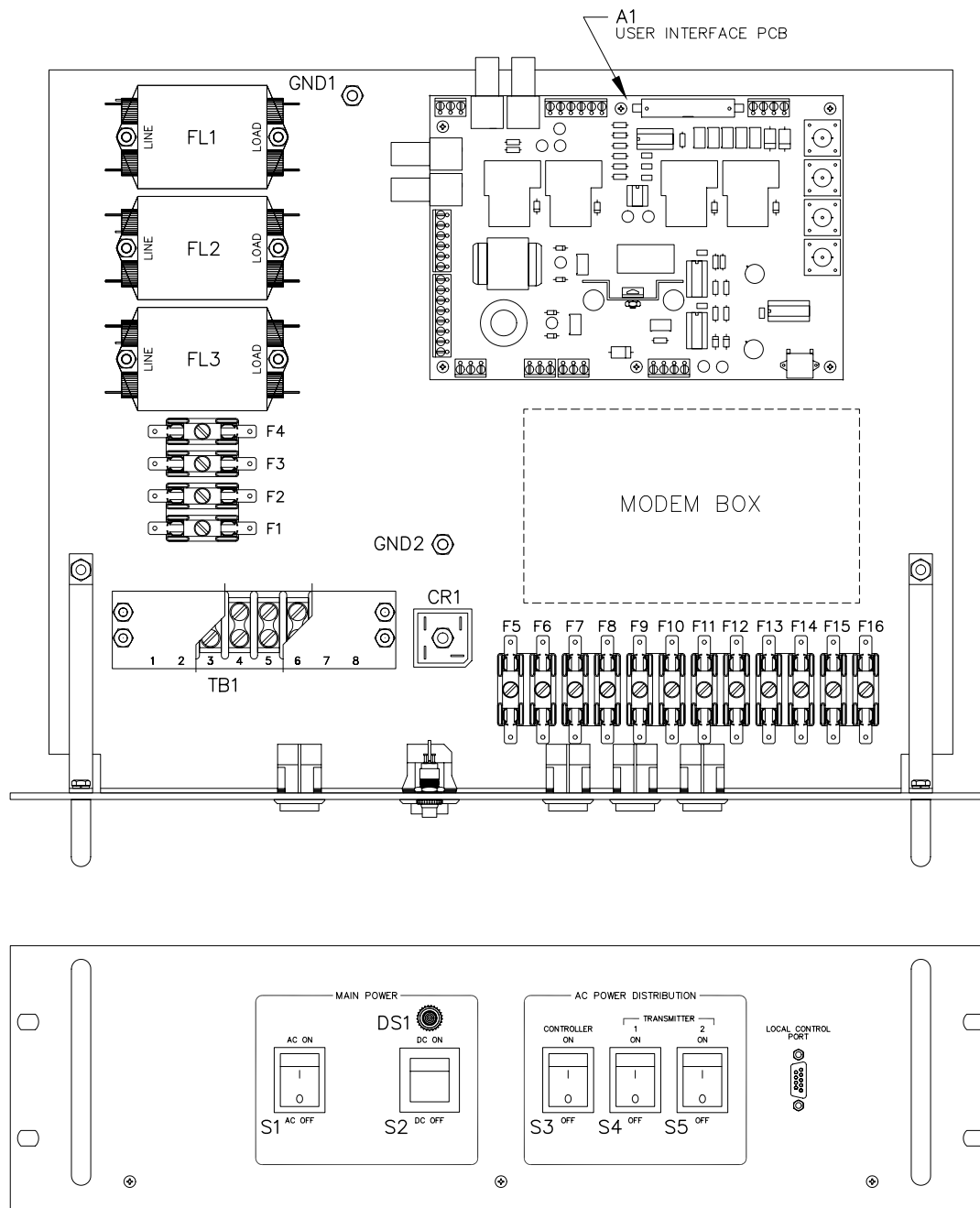
SLP10004 - Assembly, PCB RF Motherboard

<u>REFERENCE DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
C01	1C631040	CAP, 1000MF 100V ALUMINUM ELECTROLYTIC
C02	1C631570	CAP, 1500PF 400V ALUMINUM ELECTROLYTIC
C03	1C631570	CAP, 1500PF 400V ALUMINUM ELECTROLYTIC
C04	1C631570	CAP, 1500PF 400V ALUMINUM ELECTROLYTIC
C05	1C631570	CAP, 1500PF 400V ALUMINUM ELECTROLYTIC
C06	1C631570	CAP, 1500PF 400V ALUMINUM ELECTROLYTIC
C07	1C631570	CAP, 1500PF 400V ALUMINUM ELECTROLYTIC
C08	1C631570	CAP, 1500PF 400V ALUMINUM ELECTROLYTIC
C09	1C631570	CAP, 1500PF 400V ALUMINUM ELECTROLYTIC
C10	1C631570	CAP, 1500PF 400V ALUMINUM ELECTROLYTIC
CR1	1D350600	DIODE, BRIDGE RECTIFIER 600V 35A
CR2	1D004000	DIODE, RECT 4A 400V 200A SURGE BRIDGE
CR3	1D400400	DIODE, RECT 400V 1A 30 DO41
CR4	1D400400	DIODE, RECT 400V 1A 30 DO41
DS1	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS2	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
F1	9F830020	FUSE, 2 AMP, 250V, 3AG (AGC) FAST ACTING TYPE
F2	9F830031	FUSE, 3 AMP, 250V, 3AG (MDL) SLO-BLO TYPE
J14	51000018	CONN., HEADER, .025 SQ. POSTS, 10 PIN
J15	51000020	CONN., HEADER, .025 SQ. POSTS, 20 PIN
J16	56000010	CONN BNC PWB MT
J17	51000019	CONN., HEADER, .025 SQ. POSTS, 14 PIN
J25	51000025	CONN., BREAKAWAY HEADER, .156 CENTERS, 5 POS.
J26	51000025	CONN., BREAKAWAY HEADER, .156 CENTERS, 5 POS.
K1	9R190061	RELAY, POWER DPDT 48V DC 5A, PC MT
R1	1R751020	RES, 100K .25W 1% MF
R2	1R731020	RES, 1K 1/4W 1% MF
R3	1R431090	RES, 1K 11W 10PCT WW
R4	1R431090	RES, 1K 11W 10PCT WW
R5	1R751020	RES, 100K .25W 1% MF
R6	1R751020	RES, 100K .25W 1% MF
TB17A	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB17B	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB18A	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB18B	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
TB19A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB19B	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB20A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB20B	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TJ1A	55000003	CONN, DIN PCB 48 POS RECEPTACLE



TJ1B	55000003	CONN, DIN PCB 48 POS RECEPTACLE
TJ2A	55000003	CONN, DIN PCB 48 POS RECEPTACLE
TJ2B	55000003	CONN, DIN PCB 48 POS RECEPTACLE
XA3A	55000003	CONN, DIN PCB 48 POS RECEPTACLE
XA3B	55000003	CONN, DIN PCB 48 POS RECEPTACLE
XA4A	55000003	CONN, DIN PCB 48 POS RECEPTACLE
XA4B	55000003	CONN, DIN PCB 48 POS RECEPTACLE
XA5A	55000003	CONN, DIN PCB 48 POS RECEPTACLE
XA5B	55000003	CONN, DIN PCB 48 POS RECEPTACLE
XF1	9F831000	FUSECLIP PC MT
XF1A	9F833000	COVER, FUSE, QUICK FIT, BLUE
XF2	9F831000	FUSECLIP PC MT
XF2A	9F833000	COVER, FUSE, QUICK FIT, BLUE
XJ14A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ14B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ15A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ15B	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ17A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ17B	5A000030	LOCK, EJECTOR HOOK, SHORT

2.4 SLE10004 - Load Center



NOTES: 1. THIS DWG NO. SDE10004 REV. 3.
2. TITLE: COLD FIRE LOAD CENTER DRAWER DIAGRAM

SDE10004 - SD SERIES LOAD CENTER DRAWER DIAGRAM



2.4.1 User Interface PCB

SLP10001 USER Interface PCB

This PCB is Located in the USER section which contains the AC and DC Power connection Terminal, the EC filtering modules, the System Fusing and the Modem.

The USER Interface PCB combines in one central location circuitry which allows the Controller/Monitor control over Antenna Switching in Dual systems and DCAD functions(DC Automatic Disconnect). It also furnishes the Controller/Monitor with the input AC voltage level and current draw and the Battery system Voltage and current readings if DC is Optioned.

It also provides convenient interconnect to the USER for MSK interfacing (Digital Global Positioning Systems such as used by the US coast Guard)

In addition to this cross connects for voice input and phone line connections are present.



SLP10006 - Assembly, PCB, User Interface

<u>REFERENCE</u> <u>DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
C1	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C10	1C373300	CAP, 33M, 25V, TANT
C11	1C373300	CAP, 33M, 25V, TANT
C12	1C373300	CAP, 33M, 25V, TANT
C13	1C366800	CAP, 6.8M 25V TANT
C14	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C15	1C366800	CAP, 6.8M 25V TANT
C16	1C561010	CAP, CERAMIC, 1MFD 50V 10%
C17	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C2	1C373300	CAP, 33M, 25V, TANT
C3	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C4	1C373300	CAP, 33M, 25V, TANT
C5	1C621040	CAP, 100MF, 100V ALUMINUM ELECTROLYTIC
C6	1C631010	CAP, 1000MF, 25V ALUMINUM ELECTROLYTIC
C7	1C373300	CAP, 33M, 25V, TANT
C8	1C373300	CAP, 33M, 25V, TANT
C9	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
CR1	1D400400	DIODE, RECT 400V 1A 30 DO41
CR10	1D066200	DIODE, SW 80V .040A
CR11	1D066200	DIODE, SW 80V .040A
CR12	1D005200	DIODE, GR 50V .050A
CR13	1D005200	DIODE, GR 50V .050A
CR2	1D400400	DIODE, RECT 400V 1A 30 DO41
CR3	1D400400	DIODE, RECT 400V 1A 30 DO41
CR4	1D400400	DIODE, RECT 400V 1A 30 DO41
CR5	1D400400	DIODE, RECT 400V 1A 30 DO41
CR6	1D400400	DIODE, RECT 400V 1A 30 DO41
CR7	1D540400	DIODE, RECT 400V 3A 267-02 SLCON
CR8	1D540400	DIODE, RECT 400V 3A 267-02 SLCON
CR9	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
J1	56000010	CONN BNC PWB MT
J10A	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
J10B	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
J11	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
J12	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
J13	56000018	CONN, RIGHT ANGLE BNC PCB RECEPTACLE JACK
J14	56000018	CONN, RIGHT ANGLE BNC PCB RECEPTACLE JACK
J15	56000018	CONN, RIGHT ANGLE BNC PCB RECEPTACLE JACK
J16	56000018	CONN, RIGHT ANGLE BNC PCB RECEPTACLE JACK

SECTION 2

SOUTHERN AVIONICS COMPANY



J17A	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
J17B	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
J18	51000045	CONN, PC BOARD MOUNT RECEPTACLE
J19A	50000005	CONN TERM BLK, 2 POS, FRONT INLET PC MT
J19B	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
J19C	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
J2	56000010	CONN BNC PWB MT
J3	56000010	CONN BNC PWB MT
J4	56000010	CONN BNC PWB MT
J5	51000020	CONN., HEADER, .025 SQ. POSTS, 20 PIN
J6A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
J6B	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
J7A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
J7B	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
J8	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
J9	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
K1	9R190017	RELAY, SPDT, 12VDC, 30A, PCMT
K2	9R190017	RELAY, SPDT, 12VDC, 30A, PCMT
K3	9R190017	RELAY, SPDT, 12VDC, 30A, PCMT
K4	9R190017	RELAY, SPDT, 12VDC, 30A, PCMT
L1	1L000019	INDUCTOR, 220 UH @ 3.0 AMP
Q1	1T344000	XSTR NPN 250V 15MHZ TO205AD
Q2	1T344000	XSTR NPN 250V 15MHZ TO205AD
R1	1R641820	RES, 18K .25W 10 PCT CF
R10	1R738620	RES, 8.66K 1/4W 1% MF
R11	1RV41041	POT, 10K .75W CMT
R12	1R641820	RES, 18K .25W 10 PCT CF
R13	1RV41041	POT, 10K .75W CMT
R14	1RV41041	POT, 10K .75W CMT
R15	1R641820	RES, 18K .25W 10 PCT CF
R16	1R641820	RES, 18K .25W 10 PCT CF
R17	1RV41041	POT, 10K .75W CMT
R18	1RV41041	POT, 10K .75W CMT
R19	1R641820	RES, 18K .25W 10 PCT CF
R2	1R651020	RES, 100K .25W 10 PCT CF
R20	1RV41041	POT, 10K .75W CMT
R21	1R742221	RES, 22.1K .25W 1% MF
R22	1R746120	RES, 61.9K .25W 1% MF
R23	1RV41041	POT, 10K .75W CMT
R24	1R746120	RES, 61.9K .25W 1% MF
R3	1R633320	RES, 3.3K .25W 10 PCT CF
R4	1R739010	RES, 9.09K 1/8W 1% MF
R5	1R731020	RES, 1K 1/4W 1% MF
R6	1R641820	RES, 18K .25W 10 PCT CF
R7	1R651020	RES, 100K .25W 10 PCT CF
R8	1R633320	RES, 3.3K .25W 10 PCT CF
R9	1RV32030	POT, 2K .5W CMT
T1	1X000018	TRANSFORMER, 115/230V DUAL PRIMARY, 1VA,

MINATURE,

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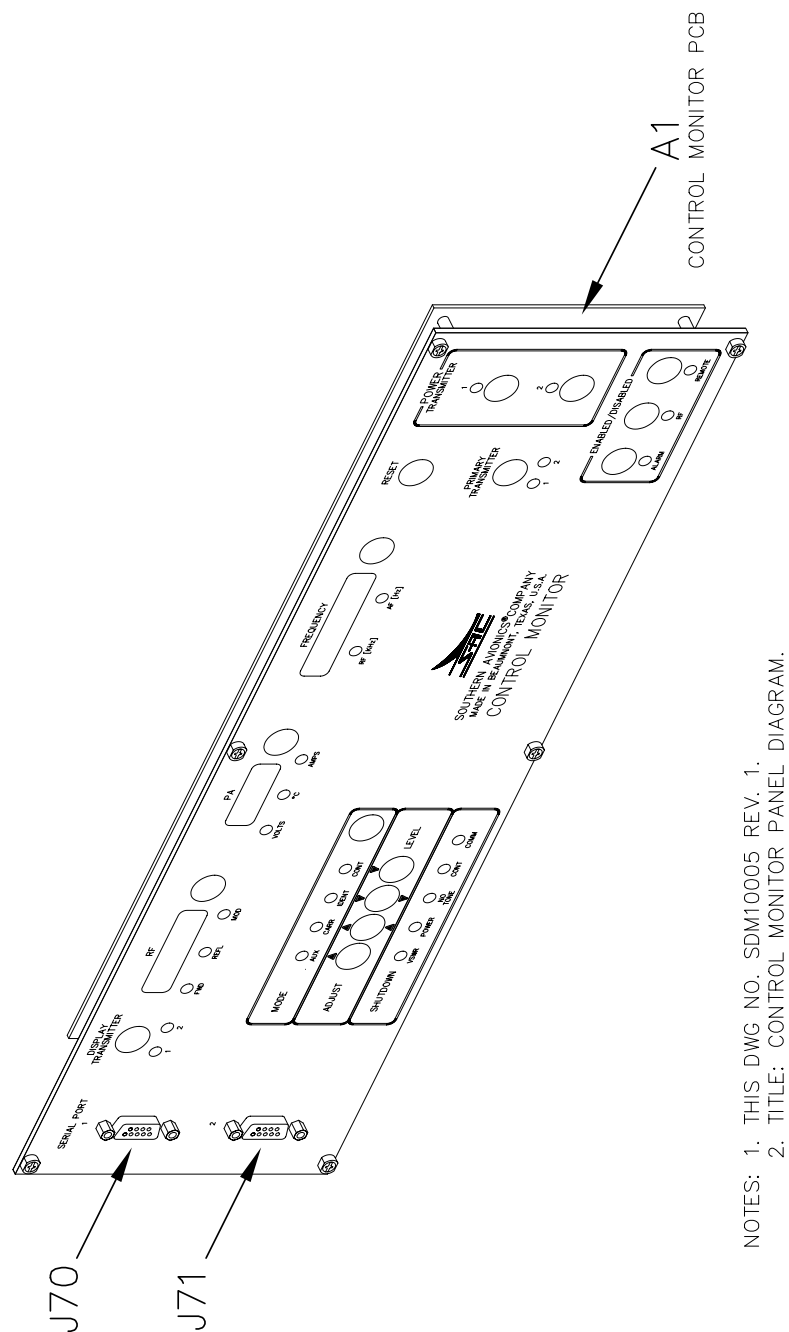
SD SERIES TRANSMITTER



T2	SLE30520	ASY XFMER 120T 06 MATL
U1	1U400100	IC QUAD 2-INP NOR
U2	1U324000	IC QUAD OP AMP
U3	1U257602	IC VOLT RGLTR 3A 1.23V TO 37V ADJ STEP DOWN
U4	1U324000	IC QUAD OP AMP
U5	1U450400	IC, CMOS HEX VOLTAGE LEVEL SHIFTER
U6	1U766200	IC CMOS 8 PIN V CONV

SECTION 2

2.5 SLM10005 - Control Monitor Panel



SDM10005 - LOCAL CONTROL PANEL DIAGRAM

2.5.1 Local Control PCB

SLP10016 – Local Control

The Optional Local Control can be used as either a local or remote operating panel. The Local Control is a microprocessor-based (Motorola M68HC11) unit offering partial control over the controller / monitor and thereby the system. It offers similar functionality to a standard front panel on older equipment.

Pushbuttons allow the user to select and or control the following:

- Primary Transmitter Select (1 or 2)
- Mode Select (ID, CONT or CARR)
- Transmitter Displayed (1 or 2)

And view readings of: readings for:

- PA Voltage
- PA Current
- PA Temperature
- Forward Power
- Reflected Power
- Modulation%
- Audio Frequency (tone)
- RF Frequency

The user can adjust or set the:

- Modulation Percentage
- RF Power output level
- RF ON/OFF
- Enable/Disable Alarms
- Select Local/Remote Control

When one of any pushbuttons is pressed except RESET, the 6811 processor sends a data command to the Controller / Monitor through the serial communication port. RESET forces Local Panel re-initialization.

The 7 segment led display update comes from the Controller / Monitor. The displays provide the 3 following groups for reading:

1. RF Power:
Up to 4 digits display the Modulation%, forward power and reflected power.
2. Power Amplifier (P.A.):
Up to 3 digits Display the voltage, current and temperature.



3. Frequency:

Up to 5 digits display the tone frequency (set) and RF frequency (measured).

The LED indicators simply display the system status. The Local Control receives a command string from the Controller / Monitor and uses this to set the status indicators.

The complex logic needed to for pushbutton control and display is accomplished using programmable gate-array logic.

The Local Control provides two serial communication ports (RS-232 / RS-485). The RS-232 port is used locally for the Controller / Monitor serial port 1. The RS-485 port is connected remotely to the Controller / Monitor port 1.

SLP10016 - Assembly, PCB, Local Control

<u>REFERENCE</u> <u>DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
01	SRP10016	PCB, CONTROL MONITOR (COLD FIRE)
C01	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C02	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C03	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C04	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C05	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C06	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C07	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C08	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C09	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C10	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C11	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C12	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C13	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C14	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C15	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C16	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C17	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C18	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C19	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C20	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
C21	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C22	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C23	6C410000	CAP, 1206 1.0UF, 25V CERAMIC
C24	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C25	6C386300	CAP, 3216 10UF 6.3V TANTALUM
C26	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C27	6C412240	CAP, 1206, 22PF, 100V, CERAMIC CHIP
C28	6C412240	CAP, 1206, 22PF, 100V, CERAMIC CHIP
C29	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C30	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C31	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C32	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C33	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C34	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C35	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C36	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C37	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C38	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C39	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C40	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C41	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C42	6C374700	CAP, 47 MFD, 16V, TANTALUM CHIP
C43	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C44	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C45	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP



C46	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C47	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C48	6C451010	CAP, 1206, .1M, 50V, CERAMIC CHIP
C49	6C422100	CAP, 1206 2.2UF, 50V CERAMIC
DS01	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS02	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS03	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS04	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS05	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS06	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS07	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS08	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS09	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS10	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS11	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS12	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS13	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS14	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS15	1DL17900	LED, LOW CURRENT, GREEN, 4MW, 2MA
DS16	1DL17900	LED, LOW CURRENT, GREEN, 4MW, 2MA
DS17	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS18	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS19	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS20	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS21	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS22	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS27	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS28	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS29	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS30	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS31	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
DS32	1DL17000	LED, HIGH EFFICIENCY RED, 2.0 MA
J21	51000042	CONN, BREAKAWAY HEADER 156 CENTER 8 POS
J22	51000030	CONN., HEADER, BREAKAWAY, 10 POS DUAL ROW
J23	51000018	CONN., HEADER, .025 SQ. POSTS, 10 PIN
R01	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R02	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R03	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R04	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R06	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R07	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R08	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R09	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R10	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R11	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R12	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R13	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R14	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R15	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R16	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R17	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R18	6R231010	RES., 1206, 1K, 1/4W, 5%, THICK FILM CHIP
R19	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R20	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM

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R21	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R22	6R231020	RES, 1206, 10M 1/4W 5% THICK FILM
R23	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R24	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R25	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R26	6R211020	RES, 1206 10K, 1/4W 5% THICK FILM
R27	6R224720	RES, 1206 4700 OHM 1/4W THICK FILM
R28	6R221202	RES, 1206, 120 OHM 1/4W 5% THICK FILM
R29	6R221202	RES, 1206, 120 OHM 1/4W 5% THICK FILM
S01	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S02	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S03	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S04	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S05	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S06	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S07	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S08	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S09	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S10	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S11	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S12	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S13	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S14	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S15	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S16	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S17	9S901023	SWITCH, MOMENTORY, PUSH BUTTON SPST
S18	9S900031	SWITCH, SPST ROCKER RAISED 4 POS
TB21A	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
TB21B	50000007	CONN TERM BLK, 3 POS, FRONT INLET PC MT
U01	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U02	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U03	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U04	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U05	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U06	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U07	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U08	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U09	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U10	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U11	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U12	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U13	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U14	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U15	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U16	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U17	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U18	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U19	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U20	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U21	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U22	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U23	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U24	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U25	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN



U26	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U27	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U28	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U29	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U30	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U31	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U32	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U33	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U34	6U451101	IC, CMOS HIGH SPEED LOGIC BCD TO 7 SEG 16 PIN
U35	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U36	9L400000	DISPLAY, NUMERIC 0.3 (RED)
U37	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U38	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U39	6U456401	IC, PROGRAMMABLE, 44 PIN TQFP
U40	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U41	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U42	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U43	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U44	6U456401	IC, PROGRAMMABLE, 44 PIN TQFP
U45	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U46	6RD31023	RESISTOR, NETWORK 1K, 16 PIN THICK FILM
U47	6U509000	IC, CHANNEL ANALOG MULTIPLEXER
U48	6U325301	IC, DUAL MULTIPLEXER/DEMULTIPLEXER BUS SWITCH
U49	1U687110	IC HCMOS 8-BIT MICONTR
U50	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U51	6U742212	IC, DUAL INVERTING, NON-INVERTING OCTAL BUFFER
U52	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U53	6U742212	IC, DUAL INVERTING, NON-INVERTING OCTAL BUFFER
U54	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U55	6U742212	IC, DUAL INVERTING, NON-INVERTING OCTAL BUFFER
U56	6U742212	IC, DUAL INVERTING, NON-INVERTING OCTAL BUFFER
U57	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U58	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U59	6U742212	IC, DUAL INVERTING, NON-INVERTING OCTAL BUFFER
U60	6U037300	IC, OCTAL TRANSPARENT D-TYPE LATCHES
U61	6U020800	IC, CMOS RS-232 DRIVER/RECEIVER
U62	1U751790	IC, DIFF DRIVER/RECEIVER PAIR, 8 DIP
W01	304A0000	WIRE 22 AWG SOLID TINNED
W02	304A0000	WIRE 22 AWG SOLID TINNED
W03	304A0000	WIRE 22 AWG SOLID TINNED
XJ23A	5A000030	LOCK, EJECTOR HOOK, SHORT
XJ23B	5A000030	LOCK, EJECTOR HOOK, SHORT
XU49	9S581002	SOCKET, PLCC, 52 PIN
Y1	1Y491520	CRYSTAL, 4.9152 MHZ

2.5.2 Audio PCB

SLP10020 OPTIONAL AUDIO PCB (AWOS)

The Audio PCB is an OPTIONAL addition to the normal system which allows the user to broadcast AWOS announcements. The Option is implemented as a plug in piggyback board to the Digital I/O PCB and consists of four sections as follows:

Voice Amplifier
Automatic Gain Control
Chebychev Passband Filter
Voice Detector

The Voice amplifier takes the nominal -17dBm signal level and boosts it to a level useable by the AGC section.

It is common mode balanced and its Gain is adjustable.

The AGC circuit is responsible for modulation limiting. It is adjusted to "capture" the level at -17dBm and output a constant modulation level to the Digital I/O PWM section up to levels exceeding +10 dBm. This section prevents inadvertent over modulation of the voice signal, and is necessary since the Controller / Monitor has no control over user input.

The Chebychev Passband filter is designed for 300 to 3000 Hz. The output at 4000 Hz is down more than 45 dB ensuring any out of band audio signals from the USER will not cause adjacent channel interference.

The Voice Detector has two functions. It detects the presence of an announcement sequence and automatically attenuates the Keying tone level down to 20% modulation. The announcement level is summed with the Keying tone level and set to achieve 95% composite modulation. This action prevents overmodulation and allows the announcement to be heard over the beacon Morse code IDENT tones. It also signals the Controller /Monitor which in turn temporarily suspends Modulation Alarms since the IDENT tone level is dropped below the alarm threshold.



2.5.1 Filter/Bridge PCB

SLP10002 - The Filter/Bridge PCB

The Filter/Bridge includes a broadband toroidal impedance transformer, a seven pole Butterworth low pass filter, a broadband RF power bridge, modulation envelope detector and associated level sampling and fault latching circuitry.

The Impedance transformer receives as input the RF Power Amplifiers Class D output and impedance matches it to the 50Ohm Butterworth Low Pass Filter, which is configured for optimum characteristics via simple jumpers for the frequency band in use. The sinusoidal 50Ohm output of the Filter is Fed then fed through the RF power bridge which reports readings of Forward and Reflected RF Power to the Controller / Monitor. The Controller / Monitor then normalizes and calibrates the power curve and calculates SWR. Fault latches are also set up to report High reflected power or RF over-current conditions for immediate action via a fault interrupt structure. A sample of the final RF output envelope is detected and sent back to the Controller / Monitor where other circuitry derives V_{max}/V_{min} information for modulation percentage calculation via Controller / Monitor firmware.

SLP10002/01 - Assembly, PCB Filter/Bridge (Standard Band)

<u>REFERENCE DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
01	SLP10002	PCB, FILTER / BRIDGE
C01	1C135190	CAP, 5100P 1000V DSM
C02	1C131090	CAP 1000P 1000V DSM
C03	1C132090	CAP, 2000P 1000V DSM
C04	1C136890	CAP, 6800P 1000V DSM
C05	1C126890	CAP, 680P 1000V DSM
C06	1C132090	CAP, 2000P 1000V DSM
C07	1C133390	CAP, 3300P 1000V DSM
C08	1C138290	CAP, 8200P 1000V DSM
C09	1C141090	CAP, 10,000P 1000V DSM
C10	1C132090	CAP, 2000P 1000V DSM
C11	1C131090	CAP 1000P 1000V DSM
C12	1C133990	CAP, 3900P 1000V DSM
C13	1C135190	CAP, 5100P 1000V DSM
C14	1C135190	CAP, 5100P 1000V DSM
C15	1C131090	CAP 1000P 1000V DSM
C16	1C136890	CAP, 6800P 1000V DSM
C17	1C132090	CAP, 2000P 1000V DSM
C18	1C126890	CAP, 680P 1000V DSM
C19	1C132090	CAP, 2000P 1000V DSM
C20	1C133390	CAP, 3300P 1000V DSM
C21	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C22	1C073310	CAP, 33M 50V ELCTLT
C23	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C24	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C25	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C26	1C073310	CAP, 33M 50V ELCTLT
C27	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C28	1C124770	CAP, 470P 500V DSM
C29	1C103070	CAP, 3.0PF 500V DSM
C30	1C103070	CAP, 3.0PF 500V DSM
C31	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C32	1C551010	CAP, CERAMIC, .1MFD. 50V, 10%
C33	1C122270	CAP, 220P 500V DSM
C34	1C122270	CAP, 220P 500V DSM
C35	1C621040	CAP, 100MF, 100V ALUMINUM ELECTROLYTIC
C36	1C631010	CAP, 1000MF, 25V ALUMINUM ELECTROLYTIC
CR1	1D005200	DIODE, GR 50V .050A
CR2	1D005200	DIODE, GR 50V .050A
CR3	1D005200	DIODE, GR 50V .050A
CR4	1D440000	DIODE, ULTRAFAST RECOV RCT, 600V,4A
L01	SLE55480	CSY COIL FLTR 250W 22T .D :10
L02	SLE45690	ASY COIL SPA FLTR :10



L03	SLE45700	ASY COIL SPA FLTR :10
L04	SLE55490	ASY COIL FLTR 250W 22T .D:10
L05	1L000017	INDUCTOR, MOLDED, SHILDED RF, 33000 uF
L06	1L000017	INDUCTOR, MOLDED, SHILDED RF, 33000 uF
L07	1L000017	INDUCTOR, MOLDED, SHILDED RF, 33000 uF
L08	1L000019	INDUCTOR, 220 UH @ 3.0 AMP
P01	51000041	CONN, HEADER 48 PIN PLUG, RT ANGLE
P02	51000041	CONN, HEADER 48 PIN PLUG, RT ANGLE
R01	1R141820	RES, 18K 1PCT .25W MF
R02	1R731020	RES, 1K 1/4W 1% MF
R03	1R731020	RES, 1K 1/4W 1% MF
R04	1R751020	RES, 100K .25W 1% MF
R05	1R761020	RES, 1 MEG OHM 1/4W 1% MF
R06	1R741020	RES, 10K 1/4W 1% MF
R07	1RV41041	POT, 10K .75W CMT
R08	1R751020	RES, 100K .25W 1% MF
R09	1R761020	RES, 1 MEG OHM 1/4W 1% MF
R10	1R741020	RES, 10K 1/4W 1% MF
R11	1RV41041	POT, 10K .75W CMT
R12	1R741020	RES, 10K 1/4W 1% MF
R13	1R751020	RES, 100K .25W 1% MF
R14	1R141820	RES, 18K 1PCT .25W MF
R15	1R731020	RES, 1K 1/4W 1% MF
R16	1R731020	RES, 1K 1/4W 1% MF
R17	1R734721	RES, 4.7K 1/4W 1 % MF
R18	1R751020	RES, 100K .25W 1% MF
R19	1R741020	RES, 10K 1/4W 1% MF
R20	1R741020	RES, 10K 1/4W 1% MF
R21	1RV15030	POT, 50 OHM 1/2W TOP ADJUST
R22	1RV15030	POT, 50 OHM 1/2W TOP ADJUST
R23	1R729320	RES, 931 OHM 1/4W 1% MF
R24	1R738220	RES, 8.2K 1/4W 1 % MF AXIAL
S01	9S902004	SWITCH, SPST DIP KEYBOARD
T1	SLE10014	ASSY, TRANSFORMER IMPEDANCE FILTER/BRIDGE
T2	1X000038	TRANSFORMER, CURRENT SENSE ENCAPSULATED
U01	1U324000	IC QUAD OP AMP
U02	1U339000	IC LOW POWER OFFSET VOLTAGE QUAD COMPARATOR
U03	1U404300	IC QUAD NOR R-S LCH
U04	1U257602	IC VOLT RGLTR 3A 1.23V TO 37V ADJ STEP DOWN
XU4	9H180001	HEATSINK, LOW PROFILE, FOR T0-220
XU4A	9I550000	INSULATOR, TERMASIL, FOR T0-220

3 INSTALLATION AND OPERATION

INSTALLATION

1.0 TEST EQUIPMENT REQUIRED

- 1.1 Calibrated 3 1/2 Digit Voltmeter
- 1.2 Calibrated Dual Trace Oscilloscope
- 1.3 Calibrated Frequency Counter (accurate to ± 1 Hz)
- 1.4 250 Watt, 50Ω Non-Inductive dummy load

2.0 UNPACKING & MOUNTING

- 2.1 Remove the Transmitter cabinet from its shipping container , open the front panel, and remove any shipping material that may be included. Make a careful inspection looking for obvious shipping damage. Remove any foreign material that may have shaken loose.
- 2.2 Some PC boards are shipped in separate boxes. Individually unpack and inspect them for any obvious shipping damage. Check the connectors for any bent pins. Be sure to do this before attempting to plug any of the PCB's in.
- 2.3 Assuming the transmitter is not to be pre-tested in a lab facility, physically mount the Cabinet to its permanent structure. See drawing SDE10018, Page 5, for mounting hole dimensions.

3.0 PLUG INS

- 3.1 See the System installation drawings, SDF31002 , Pages 9 and 10, for additional information pertaining to the following steps.
- 3.2 Remove the front panel exposing the Controller/ Monitor, Transmitter 1 and User Sections
- 3.3 Remove the Controller Monitor cover panel and set it aside
- 3.4 Verify that the Monitor/Controller, Analog I/O and Digital I/O are installed and well seated in the correct slots according to the drawing.
- 3.5 Unpack the smaller 3U sized Low Voltage Power supply PCB (SLP10017) and examine it closely for any damage.
- 3.6 Check JP1 and JP2 on this PCB and verify they set correctly for the input voltage being used.

	JP1	JP2
115 VAC	A	B
230VAC	B	A

- 3.7 Refer to Drawing SDF31002, Page 10, and insert the LVPS PCB (SLP10017) into the left-most slot. The board insertion must be exactly as shown in the drawing or serious damage may occur.
- 3.8 Remove the Transmitter 1 cover panel
- 3.9 Unpack the Transmitter 1 PCBs and examine them closely for any damage
- 3.10 Install the RF Amplifier PCB (SLP10001) in slot #2 or right next to the already installed Filter / Bridge PCB (SLP10002) . See Drawing



- 3.11 Install the PA Power Supply PCB (SLP10003) in slot # 3 or the last slot from the right.
- 3.12 On the right hand side of the Section, look at the RF Mother Board (SLP10004) and verify the transformer connectors are seated properly.
- 3.13 Replace the Transmitter 1 cover panel

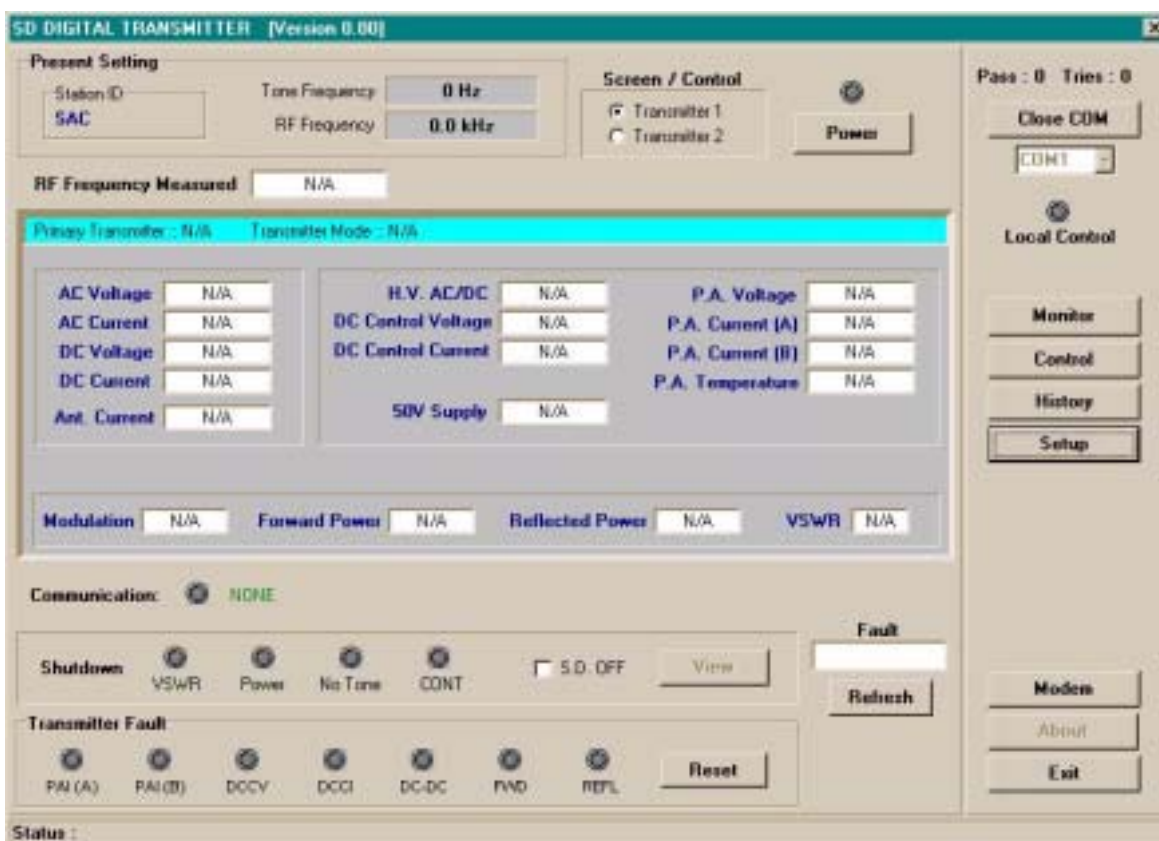
4.0 USER WIRING

- 4.1 The USER main AC breaker should be rated for 30 amps
- 4.2 Remove the mounting screws from the USER section and pull it forward on its mounting guides sufficient to allow access to the bottom rear cabling ports.
- 4.3 Utilizing the (SLM 25000/25040) installation kit route the AC, DC, and Coupler wiring into the bottom rear access holes.
- 4.4 Trim the excess wiring length to neatly reach the their individual connection points as cited below
- 4.5 Terminate the ends of the wires using the connectors supplied with the installation kit.
- 4.6 Connect a good Earth ground to the brass grounding terminal located on the bottom of the Cabinet
- 4.7 Locate the Main Power Connector TB1
- 4.8 Connect AC mains L1 to user section TB1-1 (115/230 VAC Hot)
- 4.9 Connect AC mains L2 to user section TB1-2 (115/230 VAC Neutral or Hot
- 4.10 Connect AC mains GND to user section TB1-3 (AC Power GND)
- 4.11 Connect the Battery I (current charge/discharge) Sample shielded cable center wire to TB1-4
- 4.12 Connect the Battery I (current charge/discharge) Sample shield to TB1-3 (GND)
- 4.13 Connect 48V Battery + to TB1-5
- 4.14 Connect 48V Battery - to TB1-6
- 4.15 Connect Modular telephone jack to Line In on the US Robotics modem.
- 4.16 Locate the USER Interface PCB.
- 4.17 If no modular style plug is available, a 4 wire conventional drop cable may be connected to TB8 (old J17) and the short modular jumper furnished by US Robotics connected from LINE-IN in of the modem to J65 (old J18). The connections are:
 - Tip or Green wire to TB8-1
 - Ring or Red wire to TB8-2
 - Sleeve or Yellow wire to TB8-3
 - Ground or Black wire to TB8-4
- 4.18 Connect the coupler +12V supply wire to TB4 -3
- 4.19 Connect the coupler GND wire to TB4-2
- 4.20 If the system uses MSK externally supplied RF signal connect MSK-1 to J61(old J13) and MSK-2 to J59 (old J14)
- 4.21 Dress and tie wrap the wires back to the end of the user panel.
- 4.22 Slowly push the USER drawer back in place.

- 4.23 If a 50 ohm Dummy load is available connect it to The N type RF output connector on the bottom of the cabinet for initial testing and operational verification.

5.0 PC HOOKUP AND SOFTWARE INSTALLATION

- 5.1 A Desk-top or Laptop PC capable of running either Windows 98 or later version Microsoft operating system is suitable for use as a local or remote control platform. Set the PC up near the transmitter.
- 5.2 Connect one end of a null modem RS232 cable or a standard RS232 cable with a null modem adapter to SERIAL PORT #1 on the PC
- 5.3 Locate the left hand Controller/Monitor PCB which is the second board from the left in the controller 3U Section .
- 5.4 Connect the other end of the RS232 cable to the Local Control Port, a DB9 connector on the front of the USER panel an the right hand side. (see drawing SDE 10004)
- 5.5 Start the computer and while it is booting up, locate the USER software which is included with each system shipped in an appropriately labeled protective package.
- 5.6 Load the software on the PC, following the enclosed instruction sheet which will alert you to any last minute changes that need attention.
- 5.7 Run the software and the SD DIGITAL TRANSMITTER window will open.



- 5.8 You will be required to enter a password. If no password is entered no operational changes will be allowed. Monitoring, however, will still be available.

6.0 CONTROLLER/MONITOR POWER UP



- 6.1 See drawing SDE10004
- 6.2 Turn on the Site AC breaker.
- 6.3 On the USER panel in the MAIN POWER section , Switch AC to ON and observe the switch lights up.
- 6.4 Leave the DC switch OFF for now.
- 6.5 On the USER panel in the AC POWER DISTRIBUTION section , Switch Controller to ON and observe the switch lights up.
- 6.6 Observe the illumination of DS1 and DS2 the two green LEDS on the Digital I/O PCB (SLP10009) indicating the presence of +5 and +12 volts respectively.
- 6.7 On the Low Voltage Power Supply PCB (SLP10017) Meter the following to GND (TP0) and verify the tolerances
 - 6.7.1 $TP1 = 5.0 \pm 0.25 \text{ VDC}$
 - 6.7.2 $TP2 = -11.4 \pm 0.6 \text{ VDC}$
 - 6.7.3 $TP3 = 12.0 \pm 0.6 \text{ VDC}$

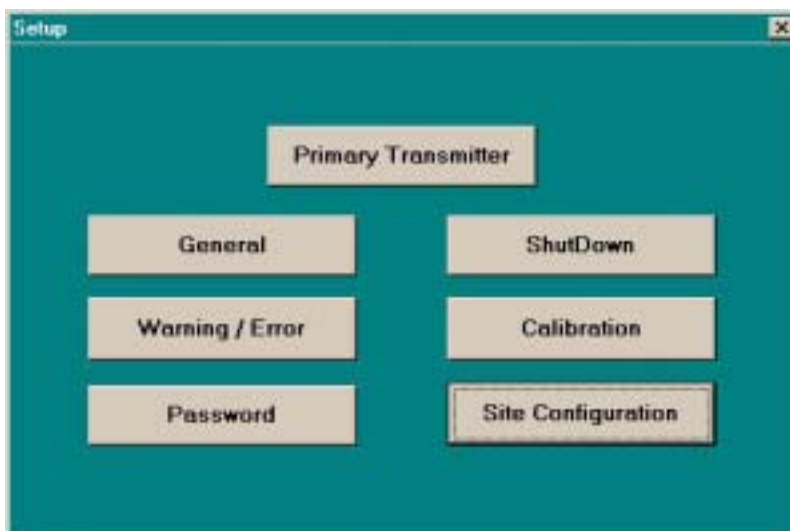
NOTE: If any of these voltages are out of tolerance and require either repair or adjustment, a modified system alignment will be required before proceeding. See the Maintenance section for more details.

7.0 SYSTEM SITE CONFIGURATION

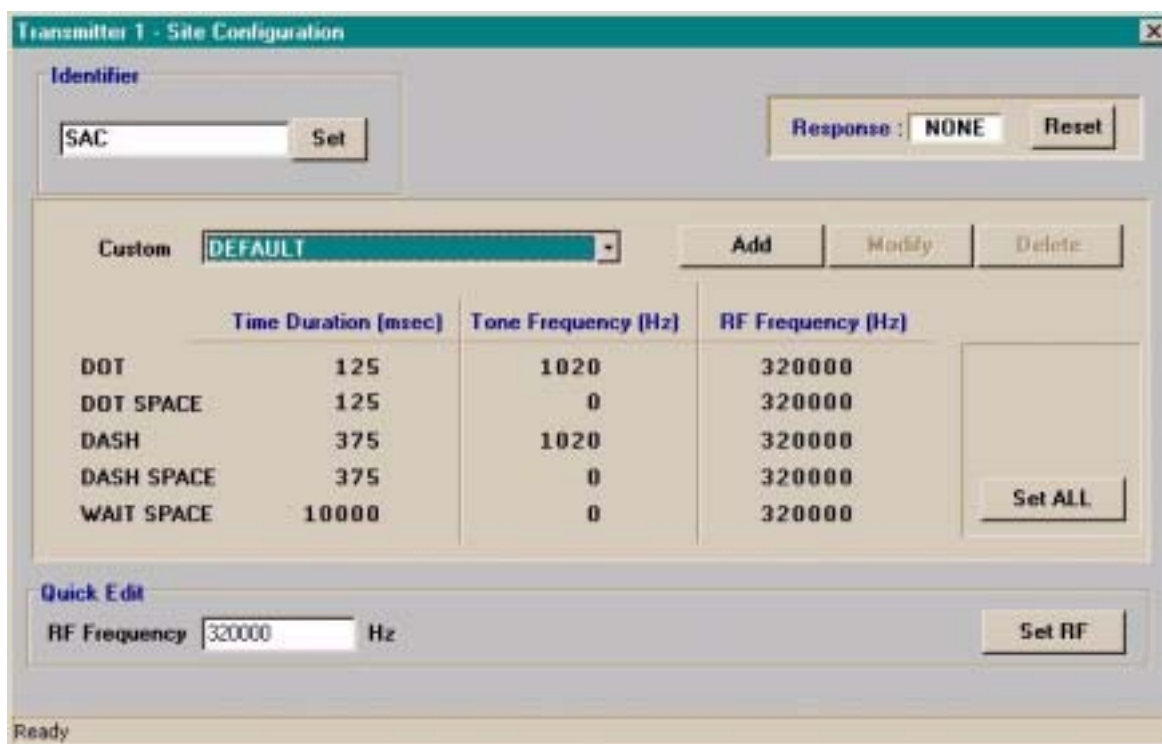
- 7.1 On the PC in the SD DIGITAL TRANSMITTER window just below the Open COM control there is a pull down menu to select a different serial port if desired. Click on the port you want then Click on **Open COM**.
- 7.2 If opening the port was successful a bell will sound and the name of the control will change to CLOSE COM

NOTE: Clicking again will close the Port so be careful not to double click. Click CLOSE COM only when you are finished communicating with the system

- 7.3 The Morse Code ID sequence, Code Timing, Key tone Frequency, and RF frequency must now all be set according to the Site License. On the PC in the SD DIGITAL TRANSMITTER window Click on **Set up**.



7.4 From the menu select **Site Configuration**



7.5 A popup window called Transmitter 1 Site Configuration will open. In this window you may choose to add a custom configuration to the selection list or simply accept the default profile and modify it as follows:

7.5.1 To modify the existing default setting

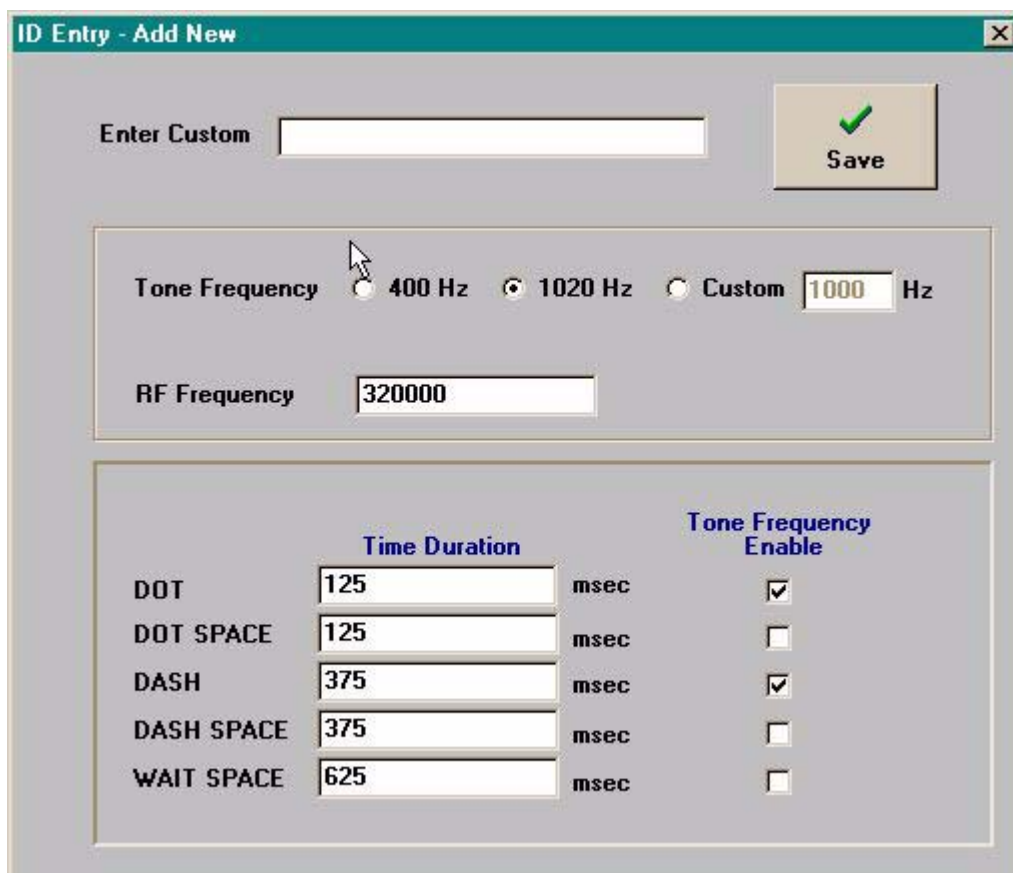
7.5.1.1. Click in the Identifier white space and change the ID to the new ID then click **Set**.

7.5.1.2. The new ID will be sent to the CF and the response window will read PASS when it is accepted

7.5.1.3. Click in the Quick Edit RF Frequency white space, enter the new frequency then click on **Set RF**

7.5.1.4. The new RF Frequency will be sent to the CF and the response window will read PASS when it is accepted

7.5.2 To Add a new Custom configuration Click on **Add** and a popup window will appear.



The dialog box titled "ID Entry - Add New" contains the following fields and controls:

- Enter Custom:** A text input field for a custom name, with a **Save** button (marked with a green checkmark) to its right.
- Tone Frequency:** Three radio buttons labeled **400 Hz**, **1020 Hz**, and **Custom**. The **Custom** option is selected, and next to it is a text input field containing **1000** Hz.
- RF Frequency:** A text input field containing **320000**.
- Time Duration and Tone Frequency Enable:** A table with two columns: "Time Duration" and "Tone Frequency Enable".

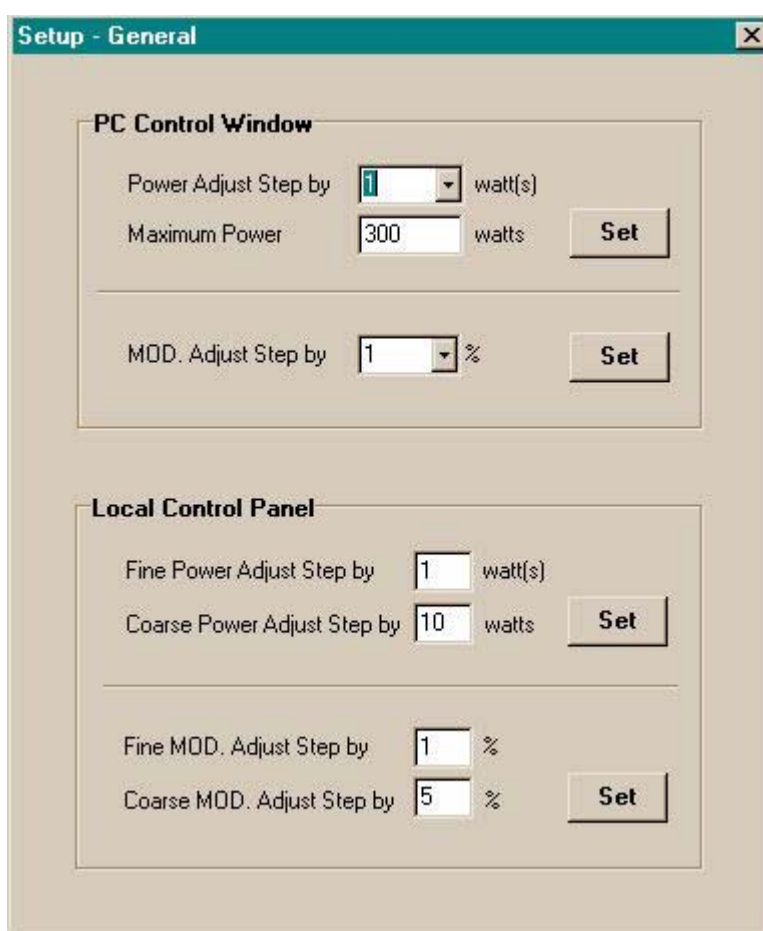
	Time Duration		Tone Frequency Enable
DOT	125 msec		☒
DOT SPACE	125 msec		☐
DASH	375 msec		☒
DASH SPACE	375 msec		☐
WAIT SPACE	625 msec		☐

7.5.2.1. Enter a custom name for this configuration. (Note that pressing enter will have no effect)

7.5.2.1.1. Select one of the 2 default tone frequencies or enter any frequency manually between 300 and 3000 Hz.

7.5.2.1.2. Enter the RF frequency for this site.

- 7.5.2.1.3. Mark/Space timing changes and tone enables are optional. They will default to the industry standard however they can be customized for special test sequences or minor adjustments necessary in certain countries. Simply change the values to those desired by clicking in the white space and entering a new value.
- 7.5.2.1.4. Click **Save**. The window will close returning to the Site Configuration window. The saved configuration will be in the custom window
- 7.5.2.1.5. Click on **Set ALL** and the new configuration will be sent to the Controller/Monitor
- 7.6 Having chosen and accomplished one of the above methods, close the Transmitter 1 Site Configuration window returning to the SETUP window.
- 7.7 In the Setup window, click on **General**, opening the general setup window



Setup - General

PC Control Window

Power Adjust Step by watt(s)

Maximum Power watts **Set**

MOD. Adjust Step by % **Set**

Local Control Panel

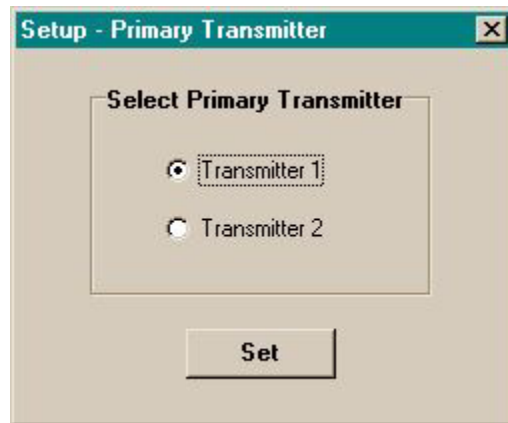
Fine Power Adjust Step by watt(s)

Coarse Power Adjust Step by watts **Set**

Fine MOD. Adjust Step by %

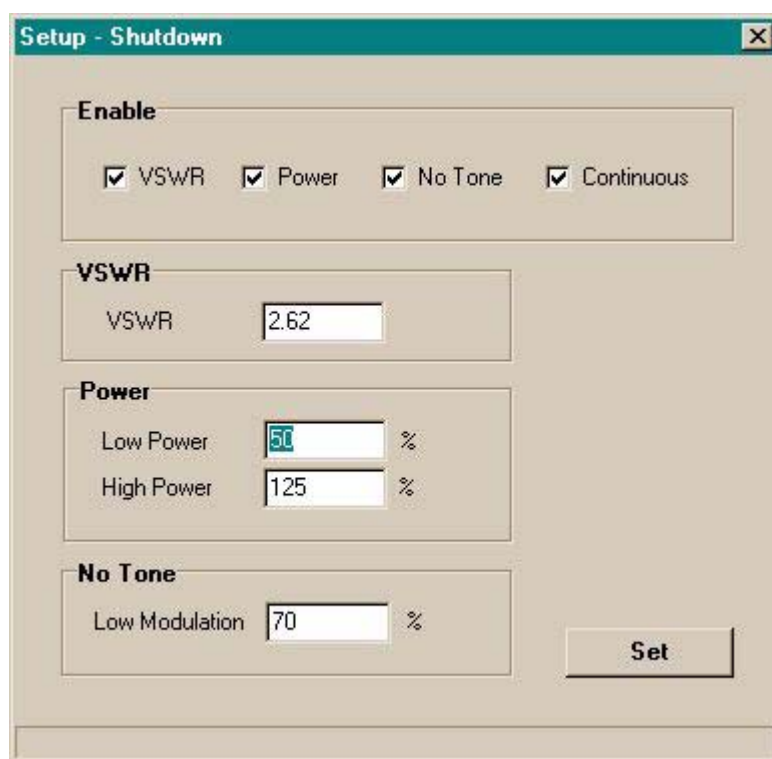
Coarse MOD. Adjust Step by % **Set**

- 7.7.1 The PC control and Local Control sections allow the USER to define the fineness of control. The Maximum Power is Factory set to coincide with the maximum power allowed by the site. A lower power may be entered if the user chooses to run at a lower power. Firmware settings will not allow more power to be output than what was licensed. Accept the defaults for now and click on the X to exit
- 7.8 In the Setup window, click on **Primary Transmitter**, opening the selection window



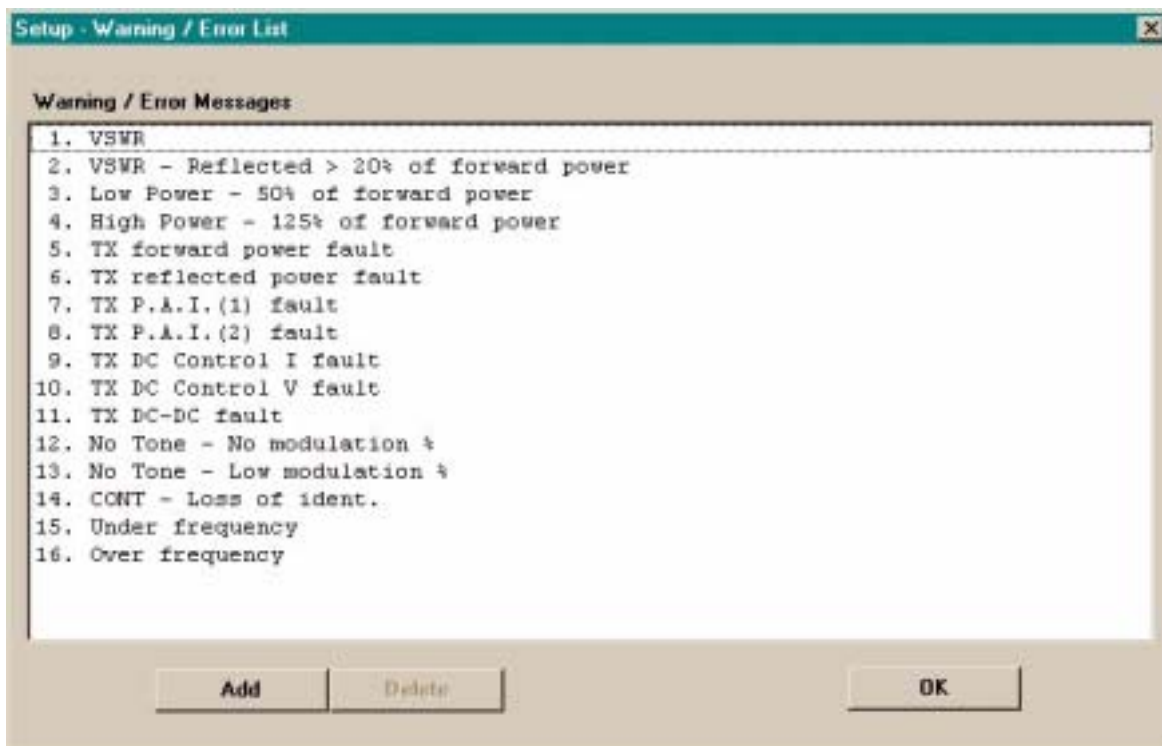
7.8.1 Accept the Default setting. If this were a Dual site you could choose which transmitter is Primary here. Just Click on **Set** to return to the Set up menu

7.9 In the Setup window, click on **Shutdown** , opening the shutdown option window



7.9.1 This section allows you to set the criterion for some of the shutdown alarms and to enable or disable them for test purposes. Since we will be testing a new installation, click to remove the checkmarks from VSWR, Power, No Tone, and Continuous, thus disabling them. Click on **Set** returning to the Setup window

7.10 In the Setup window, click on **Warning/Error** opening the warning /error list.



7.10.1 This list affords the USER a way to customize the error messages, re-writing them their native language for instance. You can change these now or accept the default messages. Click on **OK** to exit back to Setup

7.11 In the Setup window, click on **Password** opening the password window.



7.11.1 When the installation is complete a password should be entered here securing the site from un-authorized access to system configuration while still allowing casual monitoring.

7.11.2 For now no action is required so just press **X** to exit.

7.12 Press **X** to escape out of the Set up menu.

7.13 Verify the Correct Station ID, RF Frequency and Tone Frequency is displayed in the "Present Setting" section of the main screen. The middle monitoring section of the main screen will be indicating N/A in all of its display areas. (white boxes)

7.14 Having followed all the preceding steps the system should now be configured with the proper parameters to allow an operational check

8.0 OPERATIONAL CHECK

Note: The SD 250 is a Direct Digital Synthesis (DDS) based microprocessor controlled transmitter operating class D through broadband Butterworth filters. The system is quite adjustment free because of this, however there are checkpoints that should be verified with Calibrated test equipment to ensure proper operation.

8.1 Turn the AC POWER DISTRIBUTION TRANSMITTER 1 Switch (S4) on. It should illuminate.

8.2 On the PC click on **Monitor**, then select **Transmitter #1** and click on **Ready**. This signals the Controller /Monitor to begin sending transmitter data to the PC.

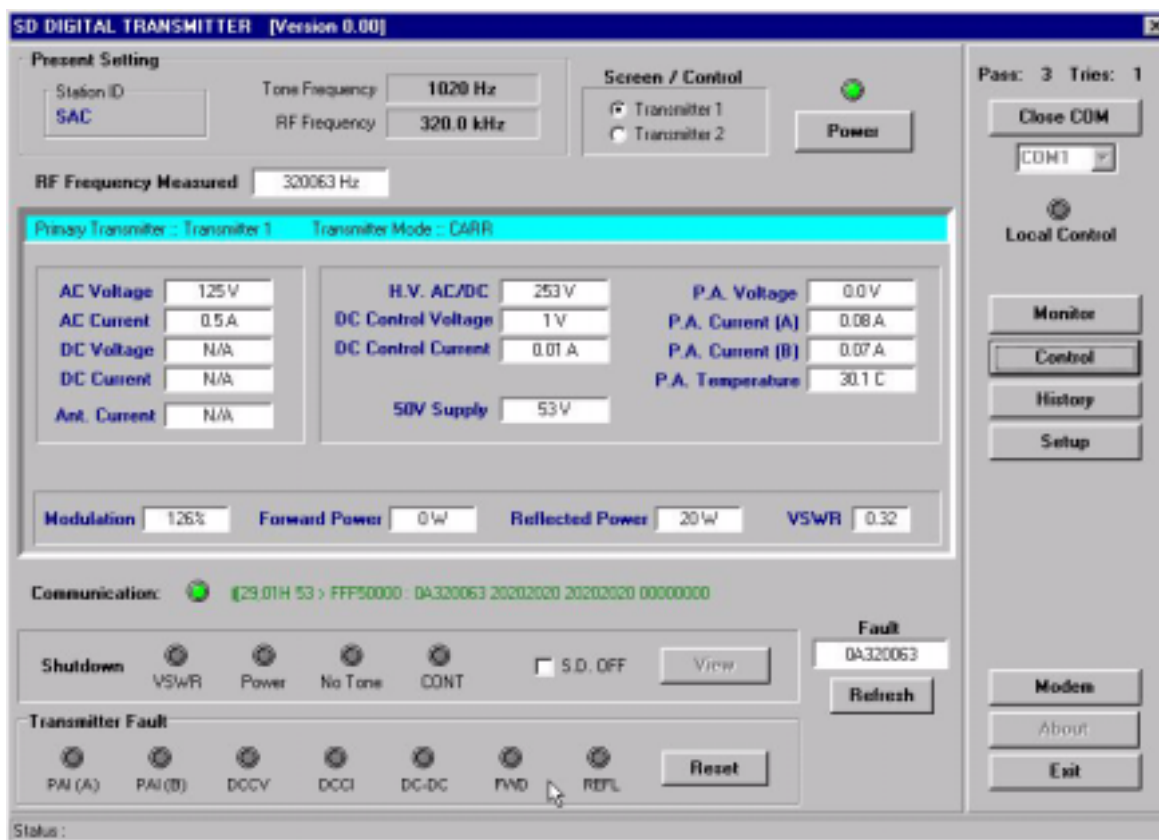
8.3 Click on Power and verify the following:

8.3.1 The High Voltage ON relay and the inrush circuit relay on the PA Power Supply PCB in the RF section will activate in sequence

8.3.2 DS2 on the RF mother board will illuminate indicating the presence of High Voltage.

8.3.3 DS1 on the PA Power Supply PCB will illuminate indicating the presence of High Voltage.

8.3.4 The data fields on the PC main window screen will fill with system wide information similar to that shown in the following screen capture



8.3.5 Note that DC Voltage, DC Current and Antenna Current readings are not shown. They are signals fed in from external sources and are optional. They must be with their own separate documentation.

8.3.6 Modulation, Forward Power, Reflected Power and VSWR fields will have arbitrary values at this time. This is normal

8.4 Frequency checks

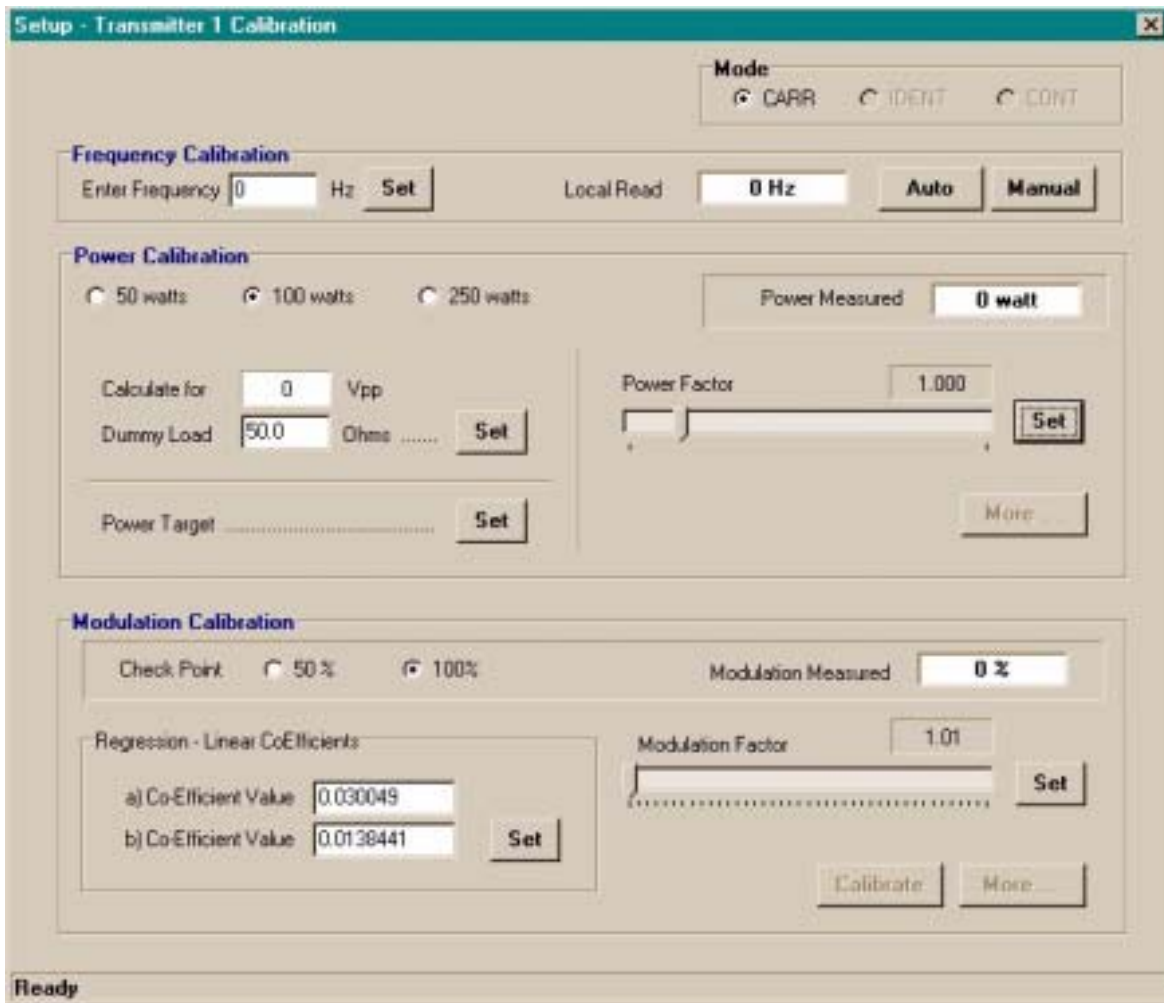
8.4.1 Connect a calibrated frequency counter to TP10 on the front of the RF Power Amplifier (SLP10001). This signal is the RF output from the Controller/Monitor DDS.

8.4.2 Verify that the frequency reads the site frequency ± 100 parts per million or in the case of the screen shown, $320,000 \pm 32$ Hz . Note: Regulations state 100 PPM is allowed if the Power is less than 200 watts, therefore to calculate the maximum deviation the formula would be as follows: **(Operating Frequency / 1,000,000) X 100**

8.4.3 If the frequency is not in tolerance calibration must be run as follows.

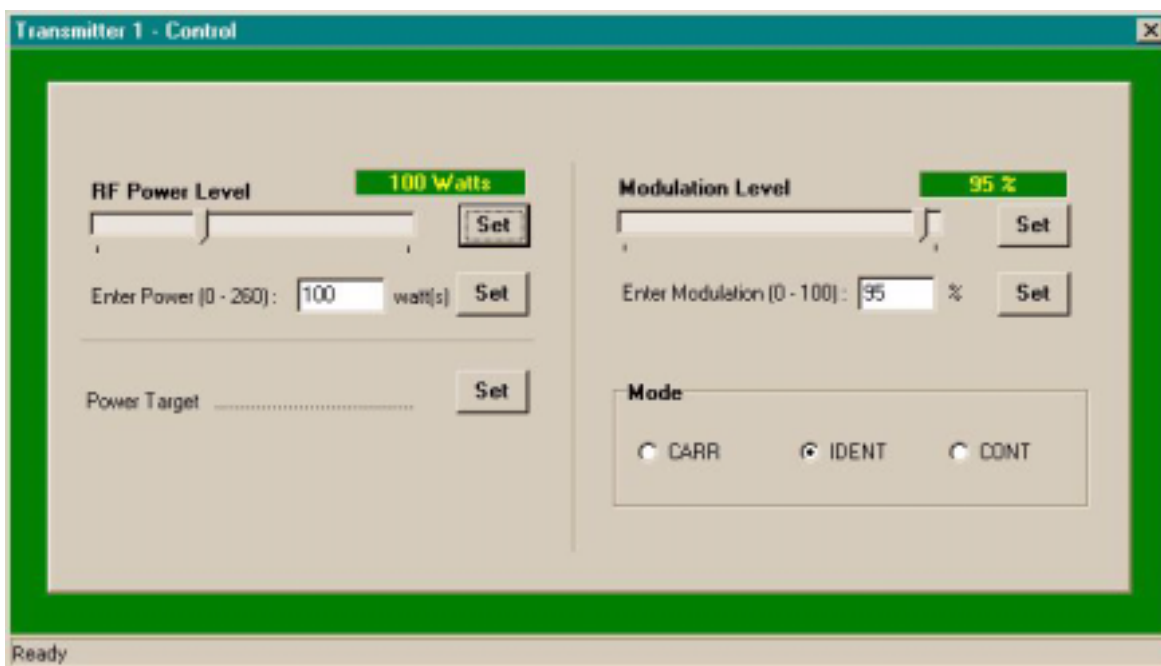
Note: Normally the DDS section is extremely accurate ($\pm 3\text{Hz}$) by itself. However a correction coefficient based on precision test equipment is generated at the factory and stored in the Controller / Monitor boards NVRAM. This Number is used to control the DDS output and will correct the frequency further. At the same time the on board frequency counter is also corrected to bring the test equipment , the output and the input into agreement. The Calibration routine should only be run if a component of the system needs replacement or if precision test equipment indicates the system is out of tolerance.

- 8.4.4 Click on Setup (see section 7.3) then click on **Calibration** opening the Frequency / Power / Modulation calibration window. NEED NEW WINDOW BELOW WHICH ADDS MANUAL MODE TO MATCH PROC!!

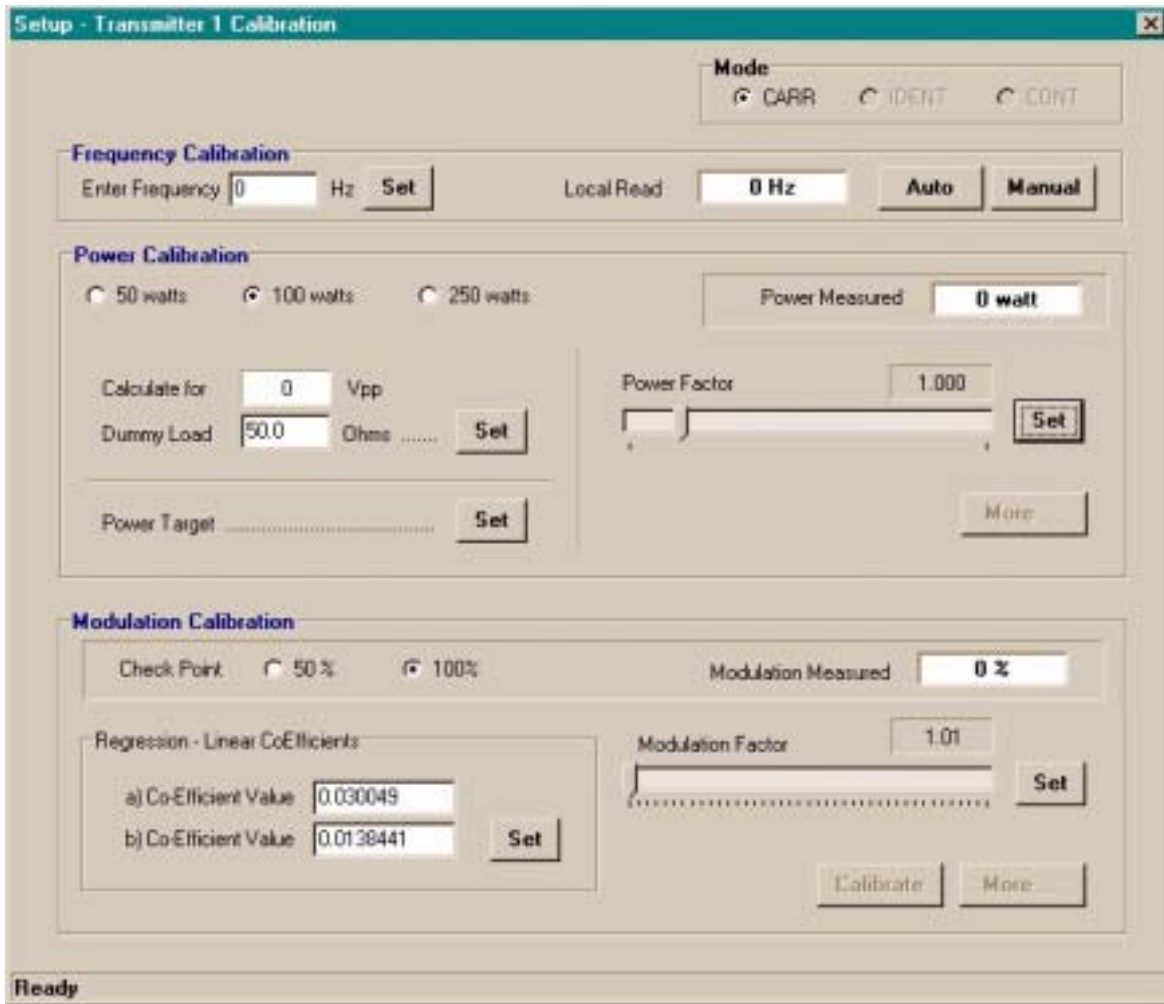


- 8.4.5 Type in the frequency of operation in the window labeled "Enter Frequency"
- 8.4.6 Click on **Monitor** and wait until the reading in the Local Read window stabilizes (about 10 seconds)
- 8.4.7 A choice is now available as to the method of calibration. If Auto is clicked The controller / monitor will recalibrate the output frequency based on its own internal counter which itself is corrected at the factory. If Manual is selected the frequency as read by precision external equipment must be input and the correction will be based on that . (we will use the latter here.)

- 8.4.8 Click on **Manual** and a popup window will appear. Enter the external frequency counters readout and click **OK**
- 8.4.9 After a few moments verify that the frequency now being read on the PC monitor agrees with the Test equipment. This completes Frequency calibration.
- 8.4.10 Close the **Calibration** and the **Setup** windows
- 8.5 RF Power output checks
 - 8.5.1 Scope the output of the transmitter at the Dummy Load
 - 8.5.2 On the PC main window again click on **Control** and verify a popup window as follows:



- 8.5.3 Manually enter or adjust the slider for 10 watts RF output power.
- 8.5.4 Verify the power output level agrees with the PC levels with the Scope using the formula $P = (V_{pp} \div 2.828)^2 / R_{DUMMY\ LOAD}$ (a direct reading calibrated power meter is also suitable). The tolerance is the same as a portable Bird wattmeter, 5%
- 8.5.5 Increase power in 5 or 10 watt steps up to the maximum allowable power verifying the power read on the test equipment agrees with the PC readout to a 5% tolerance.
- 8.6 Power Calibration
 - 8.6.1 If the Output Power is out of tolerance a power calibration will be required. Click on **Setup**, then Click on **Calibration**

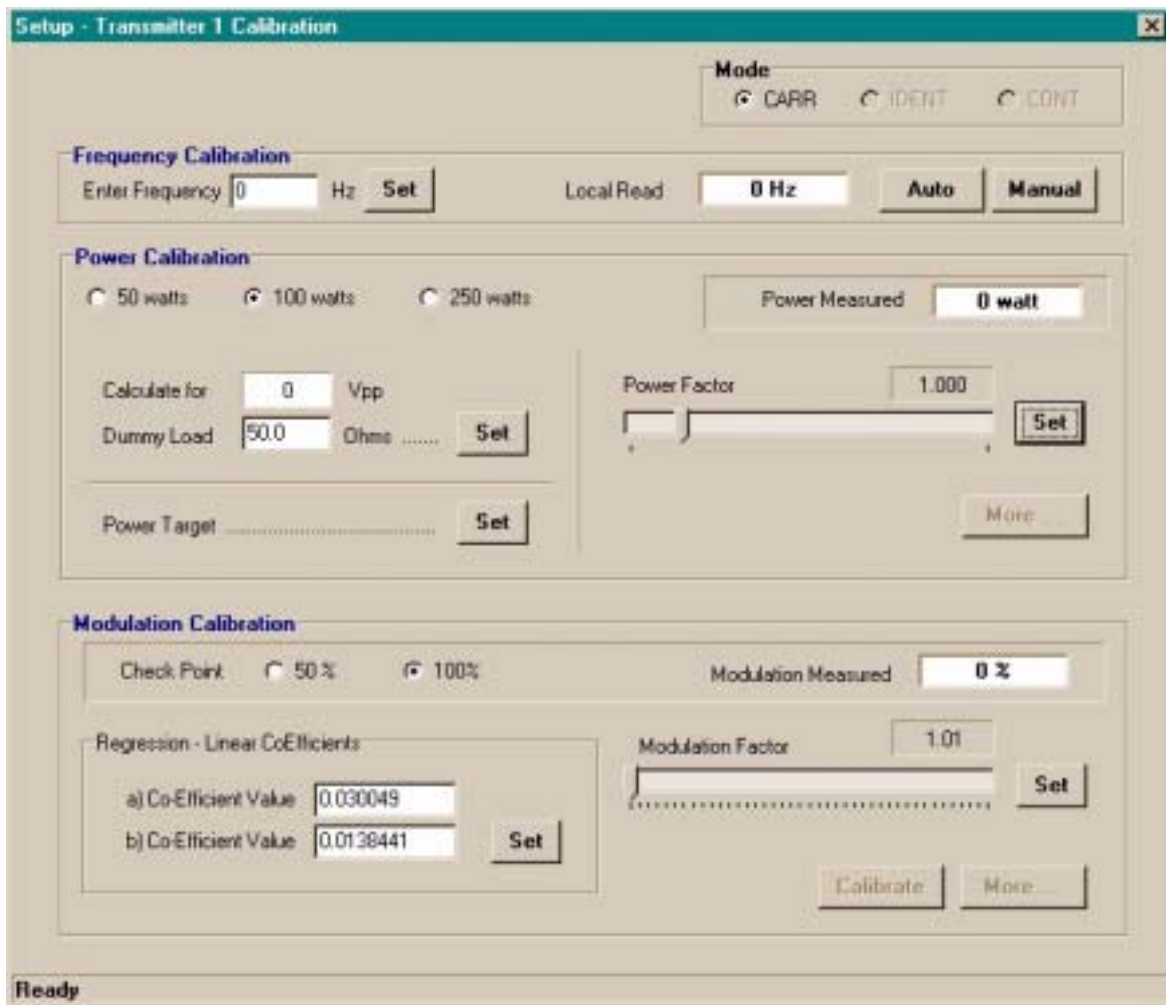


WARNING ! These Calibrations are normally done at the factory using Calibrated precision test equipment and a precision Dummy Load. A calibrated Scope and a non reactive dummy load of exact known value must be used. The power calibration cannot be done connected to the radiating system. Any attempt to do so will degrade system monitoring performance.

- 8.6.2 In the power section select a power range **equal to or less than** the maximum allowable power.
- 8.6.3 In the Dummy Load window enter the **EXACT** resistance value of the dummy load connected and click on **Set**.
- 8.6.4 The Voltage the Scope should read will show up in the **Calculate For** window for your convenience.
- 8.6.5 Observing the Scope RF Vpp value, adjust the **Power Factor** slider until the scope reads the Vpp that was calculated for it.



- 8.6.6 Click on Power Factor **Set** and Observe that the power in the **Power measured** window comes into agreement with the true power as adjusted to on the scope.
- 8.6.7 The Power curve has now been re referenced. Exit out of the Calibration and Setup menu .
- 8.6.8 Click on control and perform a few spot checks to confirm that the power being read out on the PC is accurate. Power calibration is complete. Leave the Scope attached to the dummy load and leave the System set at full legal output power.
- 8.7 Modulation Checks
 - 8.7.1 Note the carrier only Vpp level on the Scope and write it down.
 - 8.7.2 Click on **Control** and enter 100% modulation either manually or with the slider.
 - 8.7.3 Set the Scope for reading a 400 or 1020 Hz modulation envelope. Verify the modulation envelope just touches zero baseline at modulation valleys
 - 8.7.4 Verify that the modulation Vpp peaks are reaching twice the carrier Vpp ,earlier noted, within 5%
 - 8.7.5 On the PC, adjust the Modulation level down to 50%
 - 8.7.6 Read on the Scope measuring the valley and peak of the envelope. Using the formula $Mod\% = (V_{max} - V_{min}) / (V_{max} + V_{min})$ compute the actual modulation.
 - 8.7.7 Verify the set modulation and the observed modulation% agree to within 5%
 - 8.7.8 If the Modulation does not track between these two points a calibration must be performed.
- 8.8 Modulation Calibration
 - 8.8.1 Refer to the SDF31002 , Page 10, drawing and locate the Analog I/O PCB (SLP10005) in the Controller Section. Connect a Scope probe to TP102 ...(use TP0 for GND)
 - 8.8.2 Adjust the modulation level to 100%
 - 8.8.3 Adjust R10 on the same PCB until the waveform just touches the zero or GND reference point at its negative most excursion.
 - 8.8.4 Meter TP103 and adjust R101so it reads 4.0VDC
 - 8.8.5 Meter TP104 and adjust R102 so it reads 4.0VDC
 - 8.8.6 Remove the scope and meter connections
 - 8.8.7 Click on **Setup** then click on **Calibration**.



Setup - Transmitter 1 Calibration

Mode
☒ CARR ☐ IDENT ☐ CONT

Frequency Calibration
 Enter Frequency Hz Local Read

Power Calibration
☐ 50 watts ☒ 100 watts ☐ 250 watts Power Measured
 Calculate for Vpp
 Dummy Load Ohms
 Power Target Power Factor

Modulation Calibration
 Check Point ☐ 50 % ☒ 100 % Modulation Measured
 Regression - Linear CoEfficients:
 a) Co-Efficient Value
 b) Co-Efficient Value
 Modulation Factor

Ready

8.8.8 Click on the **50% set point**

8.8.9 Verify that the factory Modulation Coefficients are correctly entered. These will be listed in the factory acceptance test sheet. Re-enter them if they are corrupted or missing. Click on **Set** when they are correct

8.8.10 Adjust the **Modulation Factor** Slider until the modulation measured window reads 50%

8.8.11 Click on the **100% setpoint**

8.8.12 Verify that the modulation setting reads correctly at both points.

8.8.13 That ends modulation calibration.

8.9 Ident. Checkout



- 8.9.1 Close the Calibration and the Setup windows.
- 8.9.2 Click on Control and in the Mode section, Click on **IDENT**
- 8.9.3 Set the Modulation Level to 95% and click on **Set** .
- 8.9.4 Attach the Scope to the Dummy Load and verify that the output RF modulation envelope is being Keyed with the proper Morse code ID and timing interval as specified by the USER during setup.
- 8.10 Limits Tests.
 - 8.10.1 On the PC, Click on Control and enter a Power level greater than the Maximum allowable power.
 - 8.10.2 Observe that the controller /Monitor will not allow a power greater than the systems maximum allowable power rating as purchased.
 - 8.10.3 Return the power setting to an allowed level.
 - 8.10.4 Enter a modulation level above 100%
 - 8.10.5 Observe that the Controller/Monitor will not allow more than 100% modulation.
 - 8.10.6 Return the modulation setting to 95%
- 8.11 Optional DC/DC testing
 - 8.11.1 If Battery backup operation is to be utilized to provide power during AC power line failures Go to the Optional DC Installation Section which is included in the Options section. An OEM battery charger modified to input charge/discharge information will be explained there.
- 8.12 Optional AWOS audio PCB.
 - 8.12.1 The Audio PCB is installed and set up at the Factory and is not designed to be adjusted in the field. The Customer input level should typically be set to -17dBm however levels up to +5 dBm are acceptable
 - 8.12.2 Note that the AWOS modulation path is NOT controlled by the Controller /Monitor. Its own AGC circuitry will prevent any sustained modulation in excess of the alignment value of 95% irregardless of the customer input level
- 8.13 Closing up the system
 - 8.13.1 On the PC open the control window if not already opened and set the RF Power output to Zero
 - 8.13.2 Toggle the AC mains power switch OFF
 - 8.13.3 Replace all the previously removed front panels except the main watertight system housing cover.
 - 8.13.4 Disconnect the Dummy load .
 - 8.13.5 All general transmitter Dummy Load installation checks are complete. The transmitter is ready to be connected to the Beacon Site antenna system and no further adjustments will be required. It is not advisable to attempt any adjustments while connected to the Antenna system except those allowed by software.
- 9.0 PLACING THE SYSTEM IN OPERATION
 - 9.1 Connecting to a Southern Avionics Antenna Coupler



- 9.1.1 Install the Coupler /Antenna combination according to the Coupler Installation Manual which depends on which type is purchased.
 - 9.1.2 Connect the furnished N terminated Coax from the Transmitter RF output N connector to the Antenna Coupler . SAC couplers come with a standard N connector.
 - 9.1.3 Using the PC to control the Transmitter, follow power-up and tuning directions in the coupler manual. Basically the coupler must be set up to present a 50 OHM , minimally reactive load to the Transmitter .
- 9.2 Connecting to an OEM coupler
- 9.2.1 Depending on the Coupler an adapter may need to be furnished or a new cable fabricated by the USER. It is the USER's responsibility to verify that the coupler is one designed for a standard 50 Ohm non reactive input.

The Installation Section is Complete

SECTION 3



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4 MAINTENANCE

4.1 ALIGNMENT AND ADJUSTMENT

1.0 THE STANDARD ALIGNMENT CONFIGURATION

The standard alignment configuration is a way in which the SD250 is connected to power and load to ensure reproducibility. Any subsequent alignment procedure assumes the following hook-up.

- 0.1 Connect AC mains L1 to user section TB1-1 (115/230 VAC Hot)
- 0.2 Connect AC mains L2 to user section TB1-2 (115/230 VAC Neutral or Hot
- 0.3 Connect AC mains GND to user section TB1-3 (AC Power GND)
- 0.4 Connect the main cabinet ground to a good Earth ground.
- 0.5 Connect RF Out to a 50 Ohm non-reactive load.
- 0.6 Connect Battery I Sample to TB1-4
- 0.7 Connect Battery + to TB1-5
- 0.8 Connect Battery - to TB1-6
- 0.9 The Local PC used to communicate with the SD250 should be commonly grounded with the unit.

Be aware that many PC's are not shielded that well and may behave strangely or lock up if located where intense RF fields exist. Therefore keep the PC as far away from the coupler /antenna as possible.

4.2 CONTROL MONITOR

4.2.1 ANALOG I/O ALIGNMENT

1.0 PRELIMINARY SET-UP

- 0.1 Successful alignment of this PCB requires a fully functional system and a previously aligned RF section.
- 0.2 Adjust R14 And R15 fully CCW
- 0.3 Verify that all ac and dc power switches are turned off
- 0.4 Connect a PC to the Controller / Monitor local port with an RS232 null modem cable.
- 0.5 Turn the PC on and Load and Run the USER Software supplied with the System
- 0.6 Turn on AC main power switch
- 0.7 Turn on the Controller / Monitor AC Distribution power switch
- 0.8 Turn on the Transmitter 1 AC Distribution power switch
- 0.9 On the PC click on Open Port
- 0.10 Click on ID CONFIG and set up for the normal frequency of operation.
- 0.11 Click POWER ON



1.0 FORWARD / REFLECTED POWER ALIGNMENT

- 1.1 Set Mode to CARRIER
- 1.2 Set the RF POWER level to the maximum power allowed.
- 1.3 Meter TP101 and adjust R101 for 3.50VDC (this setting allows for continuous modulation power readings not to exceed 5.0VDC max)
- 1.4 Set the RF POWER level to Zero
- 1.5 Disconnect the dummy load creating a 100% reflected power condition
- 1.6 Increase RF POWER to 25 watts
- 1.7 Meter TP101 and record
- 1.8 Meter TP102 and adjust R102 until it is the same as TP101
- 1.9 Set the RF POWER level to Zero
- 1.10 Re-connect the dummy load and connect calibrated Scope to read Power accurately
- 1.11 On PC click on Power Calibration
- 1.12 Follow screen prompts to establish the Power Correction Factor. When complete make sure to STORE results.
- 1.13 Exit the Calibration Menu
- 1.14 Check the Power calibration from low power to high power and verify Power indicated by the Controller/ Monitor as seen on the PC readout is accurate to within 2%

2.0 MODULATION DETECTOR ALIGNMENT

- 2.1 Set Mode to CONTINUOUS
- 2.2 Set MODULATION to 50%
- 2.3 Set the RF POWER level to 50% of the maximum power allowed
- 2.4 Connect a scope to TP1 and verify the presence of a tone frequency audio AC signal riding above ground.
- 2.5 Connect the scope to TP2 again verifying the presence of the same tone frequency audio signal being clamped near ground.
- 2.6 Adjust R8 until the negative swing of the signal just touches ground.
- 2.7 On the PC increase the RF POWER level to the Maximum Allowed or 50 Watts whichever is greater.
- 2.8 Attach a meter to TP3 (Vmax DC output)
- 2.9 Adjust R14 until TP3 reads 4.0 VDC
- 2.10 Attach a Meter to TP4 (Vref DC output)
- 2.11 Adjust R15 until TP4 reads 4.0VDC

4.2.2 DIGITAL I/O ALIGNMENT

1.0 PRELIMINARY SET-UP

- 1.1 Successful alignment of this PCB requires a fully functional system and a previously aligned RF section.
- 1.2 Verify that all ac and dc power switches are turned off
- 1.3 Adjust R5 fully CW
- 1.4 Connect a PC to the Controller / Monitor local port with an RS232 null modem cable.
- 1.5 Turn the PC on and Load and Run the USER Software supplied with the System
- 1.6 Turn on AC main power switch
- 1.7 Turn on the Controller / Monitor AC Distribution power switch
- 1.8 Turn on the Transmitter 1 AC Distribution power switch
- 1.9 On the PC click on Open Port
- 1.10 Click on ID CONFIG and set up for the normal frequency of operation.
- 1.11 Click POWER ON
- 1.12 Set the RF POWER level to Zero
- 1.13 Set Mode to CARRIER

2.0 PULSE WIDTH MODULATOR ALIGNMENT

- 2.1 Scope TP2 and adjust R9 for a 75,000 $\pm$ 500 Hz, +4 VDC to -4 VDC triangle-wave.
- 2.2 Scope TP3 and observe a 75000 Hz square wave that is +12Vpk and less than 50% duty cycle.
- 2.3 Adjust R28 for an exact 45% duty cycle square-wave at TP3. Note that this setting is critical and is the basis for modulation purity and all subsequent power alignment. Calibration of the RF section is based on this waveform.
- 2.4 Set the RF POWER to the maximum allowed power or 100 watts whichever is LEAST
- 2.5 Measure the output power with a calibrated scope at the dummy load.
- 2.6 If the power output is not within 2% of the power setting then the output of the controller/monitor must be verified and the calibration pot on the PA Power supply PCB must be re-adjusted. This is easy to do. It must be stressed that tweaking of the duty cycle to achieve alignment is not acceptable.
- 2.7 Set up the scope attached to the dummy load for monitoring the modulation envelope.
- 2.8 Set the RF POWER to 25 watts.
- 2.9 Set the Mode to CONTINUOUS
- 2.10 Set the Modulation to 100%
- 2.11 Adjust R30 until the modulation envelope is indicating 100% modulation
- 2.12 Set the RF POWER level to the maximum power allowed.



- 2.13 Fine Adjust R30 again for 100% modulation.
- 2.14 Set the RF POWER to 25 watts.
- 2.15 Set the Modulation to 125%
- 2.16 Adjust R5 until the modulation envelope peak just begins to be limited as indicated by flat-topping.
- 2.17 Reduce Modulation to 95%
- 2.18 Set the RF Power to the normal allowed output Power
- 2.19 Set the Mode to IDENT
- 2.20 If the optional Audio PCB is included proceed to the SLP10020 alignment section
- 2.21 This completes Digital I/O alignment

4.2.3 AUDIO OPTION (AWOS) ALIGNMENT

PRELIMINARY SET-UP

- 2.1 Successful alignment of this PCB requires a fully functional system and a previously aligned Digital I/O PCB
- 2.2 Verify that all ac and dc power switches are turned off
- 2.3 Disconnect the main AC input by either unplugging the unit from the mains or turning OFF the main USER supply breaker.
- 2.4 An audio test generator with a 600 Ohm variable output calibrated from +10 to -40 dbm is required.
- 2.5 Connect the Audio Generator output to TB6 on the User Interface PCB in the USER section. Connect the individual wires as follows: (see assembly drawing SAP10006)
 - +Audio to TB6-1
 - Audio to TB6-2
 - Shield to TB6-3
- 2.6 Remove the Digital I/O PCB from the Control Monitor Section and set JP1 to 1-3 and JP2 to 1-2 . Install the piggyback Audio PCB (see drawing SAP10020 for details)
- 2.7 Set The Audio PCB Jumpers JP1 to 1-3, JP2 to 1-2
- 2.8 Place the Digital I/O PCB on an extender and re-install it.
- 2.9 Re-establish the main AC Power source.
- 2.10 Connect a PC to the Controller / Monitor local port with an RS232 null modem cable.
- 2.11 Turn the PC on and Load and Run the USER Software supplied with the System
- 2.12 Turn on AC main power switch
- 2.13 Turn on the Controller / Monitor AC Distribution power switch
- 2.14 Turn the Transmitter 1 AC Distribution power switch ON
- 2.15 On the PC click on Open Port
- 2.16 Click on ID CONFIG and set up for the normal frequency of operation.



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4.3 TRANSMITTER

4.3.1 PA POWER SUPPLY ALIGNMENT (PAPS)

Safety Note: Dangerous voltages are present on this PCB during power on tests. Be very careful when working on this board. When power is removed dangerous voltage will still be present on the HV cap bank. A built in HV Bleeder on the mother board will discharge the HV cap bank in about 30 seconds. Red LED DS1 will be on if power is present. Another LED on the mother board will also indicate HV presence. Verify this with a meter check at either end of R69 until you are personally confident the bleeder circuit and associated indicators are operating correctly.

Note: To be able to successfully complete this alignment without using special loading fixtures we rely on a normal load being presented to the supply by the RF Power Amplifier PCB and Filter PCB. Therefore it is important that those PCBs be aligned and in good working order.

1.0 PRELIMINARY CHECKS AND ADJUSTMENTS

- 1.1 Verify that all ac and dc power switches are turned off .
- 1.2 Connect a PC to the Controller / Monitor local port with an RS232 null modem cable.
- 1.3 Turn the PC on and Load and Run the Controller / Monitor user Software supplied with the System
- 1.4 Remove the RF power amplifier PCB which removes the load from the PAPS
- 1.5 Remove the PAPS PCB and place it on the extender fixture.
- 1.6 Adjust R32,R38,R15, R41, R43, R48 and R66 fully clockwise (CW)
- 1.7 Adjust R4, R7, and R40 fully counterclockwise (CCW)
- 1.8 Adjust R45 and R46 for middle range
- 1.9 Toggle the Manual HV switch S3 to the OFF position (actuator thrown toward the front of the PCB)
- 1.10 Move jumper JP1 to 3-4 (lower position) enabling local power control

2.0 DC CONTROLLER SECTION LOW VOLTAGE ALIGNMENT

- 2.1 Turn the main power AC switch on. . **Caution! Input HV is on!**
- 2.2 Turn the AC distribution switch for Transmitter 1 or Transmitter 2 on depending on where the extender is being used.
- 2.3 Verify the presence of +50vdc on TP1 of the RF motherboard in use.
- 2.4 Adjust R43 for 12.00 ± 0.1 vdc at TP11
- 2.5 Adjust R48 for 12.00 ± 0.1 vdc at TP13
- 2.6 Press the manual reset buttons S1 and S2
- 2.7 Adjust r4 for 4.00 ± 0.01 vdc at TP1
- 2.8 Initially adjust R7 for approximately 2.7vdc at TP5
- 2.9 Scope TP2 and further adjust R7 until an approximate 50% duty cycle 75khz square-wave is seen. A loose feel to the adjustment is normal since HV feedback which stabilizes the signal is not yet present.
- 2.10 Read TP2 with a calibrated frequency counter and adjust R20 for 75 kHz ± 500 Hz. Note that this frequency is not critical but is optimum for the inductor used in the buck converter.

- 2.11 Connect channel 2 of the scope to TP3 and verify that the two signals are 180 degrees out of phase and have approximately 250 nano-seconds dead time between them. Dead time is here defined as that period when both signals are low at the transition point between one being high and the other being low.
- 2.12 Connect scope channel 1 and 2 to the gates of Q1 and Q2 and verify the 75khz signals are 180 degrees out of phase.
- 2.13 Important! Adjust R7 fully CCW

3.0 DC-DC CONVERTER LOW VOLTAGE ALIGNMENT

- 3.1 Scope TP12 and adjust R45 for 75kHz $\pm$ 500Hz . Then adjust R46 for 50% duty cycle.
- 3.2 Scope The Gates of Q4 and Q5 and readjust R46 until the 75 kHz signal is at a 50% duty cycle. Some readjustment between R45 and R46 may be necessary.
- 3.3 Remove the scope leads
- 3.4 Adjust R57 until TP16 is at 2.50 $\pm$ 0.01VDC . This sets the DC-DC HV shut down level to 250V or more. Built in hysteresis will cause the supply to slowly discharge to 220VDC and again turn on if no current is being drawn by the RF Power Amplifier.
- 3.5 Meter TP14 and adjust R66 for 3.75 $\pm$.01 VDC This sets the DC-DC over-current shut down point equivalent to 250W @125% Modulation. This setting is good for all power ranges.

4.0 DC CONTROLLER HV ALIGNMENT , UNLOADED

- 4.1 Adjust R82 for 1.30 volts at TP17. This sets the inrush limiter to drop out at 130 Volts
- 4.2 Using the manual HV switch S3 turn on High Voltage. Be Aware of any unusual behavior and be ready to shut off main power.
- 4.3 Relay K1 will be heard activating immediately followed by K2 a short time later. This is the inrush sequence. The first time HV is turned on, two (2) distinct relay closures should be heard as the HV caps charge up. If the Cap bank is already charged both relays will pull in simultaneously. Verify that DS1 illuminates as well as the LED on the mother board.

Note: It is important to realize that the HV ON/OFF switch does not bleed off the HV cap bank. The bleeder turns on only when 50V turns off. This means AC and DC power must both be removed.

- 4.4 Verify 250VDC at TP2 on the RF Motherboard.
- 4.5 Meter TP6 And slowly Adjust R7 (power output calibration control) observing the voltage gradually increasing.
- 4.6 Depending on the maximum power the transmitter will be operating at continue to adjust R7 until the nominal output DC voltage for that power is reached as listed below:



Maximum Power	DC Controller Output
250 Watts	160 VDC
100 Watts	100 VDC
50 Watts	72 VDC
25 Watts	50 VDC

- 4.7 The PAPS is now calibrated for Maximum normal output based on an expected 4.0V feed from Controller / Monitor. Do not disturb the R7 setting again until it is connected to the RF Amplifier it will feed, at which time fine adjustments may be required.
- 4.8 Adjust R4 (manual power control) fully CCW. In the future any manual test power control will be done with this pot only.
- 4.9 Meter TP8 and Adjust R32 to read 1.90 ± 0.05 VDC setting the DC Controller over-voltage fault level to 190VDC
- 4.10 Meter TP9 and adjust R38 to read 0.59V. This sets the Maximum peak current to a value similar to that drawn when running 250 Watts and over-modulating 120% (This setting should be set slightly higher than the RF PA shutdown setting allowing better diagnostic analysis)
- 4.11 Turn off all power switches
- 4.12 Switch OFF HV manual control switch S3
- 4.13 Allow any HV to Bleed off ensuring HV indicator LEDDS1 is extinguished.

5.0 DC CONTROLLER HV ALIGNMENT WITH RF POWER AMPLIFIER INSTALLED

- 5.1 Move JP1 the jumper to 1-2 (the upper position) enabling Controller / Monitor control
- 5.2 Install The RF Power Amplifier PCB
- 5.3 Ensure that the Filter/Bridge PCB is installed and strapped for the Frequency of operation
- 5.4 On the RF Mother PCB remove F1 and connect a 10 Amp Current meter across the fuse-holder.
- 5.5 Connect Channel 1 of the Scope across the 50 Ohm NI dummy load.
- 5.6 Turn on Main AC power and switch on Controller / Monitor power
- 5.7 On PC click on the ID CONFIG button and set the frequency of operation for the filter installed. Close the window when done.
- 5.8 Turn on Transmitter 1 AC power distribution switch .
- 5.9 On the PC Click on the POWER ON button and verify the HV led illuminates.
- 5.10 On the PC click on the CONTROL button opening the Power/Modulation control window
- 5.11 Set the RF power level to the 25% of the maximum power allowed on site. Verify the correct RF power output on the Scope. $P_{out} = (RF_{VPP} \div 2.828)^2 \div R_{dummy\ load}$
- 5.12 Increase Carrier power until maximum allowed power is reached as indicated on the monitoring Scope on the dummy load.



- ### 4.3.2 RF POWER AMPLIFIER ALIGNMENT (PA)

SOUTHERN AVIONICS COMPANY
SD SERIES TRANSMITTER



this with a meter check at either end of R69 until you are personally confident the bleeder circuit and associated indicators are operating correctly.

Note: To be able to successfully complete this alignment without using special loading fixtures we rely on a normal load being presented to the RF Power Amplifier by the Filter/Bridge PCB. Therefore it is important that the Filter/Bridge PCB be optioned for the correct frequency and in good working order.

1.0 PRELIMINARY SET-UP

- 1.1 Verify that all ac and dc power switches are turned off
- 1.2 Connect a PC to the Controller / Monitor local port with an RS232 null modem cable.
- 1.3 Turn the PC on and Load and Run the Controller / Monitor user Software supplied with the System
- 1.4 Remove the RF Amplifier PCB and place it on the extender fixture.
- 1.5 Set JP1 jumper to connect 1-2
- 1.6 Adjust R38 fully CCW
- 1.7 Adjust R14, R20, and R28 fully CW
- 1.8 Turn The Main AC power switch ON
- 1.9 Turn the Controller / Monitor AC distribution switch ON
- 1.10 On the PC screen Click on OPEN PORT
- 1.11 Click on ID CONFIG and set up for the proper Site RF frequency and Tone
- 1.12 Click on Power OFF

2.0 RF Power Amplifier low level alignment

- 2.1 Turn the Transmitter (1 or 2) AC Power Distribution Switch ON
- 2.2 Meter TP1 and Adjust R38 CW to read 12.0 ± 0.01 vdc
- 2.3 ON the PC click on Power ON
- 2.4 Scope TP10 and verify the presence of 5V square-wave RF at the previously selected Frequency. If an outside user source of RF is being used it should have a minimum level of 1Vpp
- 2.5 Scope TP9 and adjust R31 for a 10 Vpp RF signal at the same frequency
- 2.6 Scope TP11 and adjust R37 for a 50% duty-cycle
- 2.7 Scope TP12 and verify a 50% duty cycle 30Vpp RF signal at the same frequency
- 2.8 Using 2 channels Scope the Phase of the Gate signals at Q4, 5, 6 and 7.
- 2.9 Verify that Q4 and Q7 are in phase.
- 2.10 Verify that Q5 and Q6 are in phase
- 2.11 Verify that Q4 and Q5 are 180 deg. Out of phase
- 2.12 Attach the Dual Scope probes to TP2 and TP3
- 2.13 Verify TP2 is a +12Vpk 75kHz square-wave with a 45% duty cycle
- 2.14 Verify TP3 is a +12Vpk 75Khz square wave 180 degrees out of phase with TP2

- 2.15 Be sure of the above Verification! TP2 and TP3 must be correct and out of phase or serious damage to the PA will result when HV is applied in the subsequent steps.
- 2.16 Turn Transmitter (1 or 2) AC Power Distribution switch OFF
- 3.0 RF Power Amplifier high level adjustments.
 - 3.1 Connect an RF Ammeter in series at JP1 the large current jumper.
 - 3.2 Turn Transmitter (1 or 2) AC Power Distribution switch ON
 - 3.3 On the PC click on POWER ON.
 - 3.4 On the PC, click on Control opening the Power/Modulation page
 - 3.5 In the PC Control window Set the mode to CARRIER
 - 3.6 Set the RF power control to 10 watts and click on set.
 - 3.7 Scope the RF output at the dummy-load and verify the power output is 10 ± 0.5 Watts. Also verify the waveform is a clean sinewave.
 - 3.8 On the PC increase the RF power output, being careful not to exceed the test meter rating, to the maximum allowable output and verify it at the dummy load. If this power is too much for the meter range select the highest power you can read on scale
 - 3.9 Read the current displayed on the RF Ammeter. (@100W 2.7Amps is typical) ,divide the Ammeter value by two (2) and record the value.
 - 3.10 Connect a Meter between TP4 and TP8 then fine Adjust the duty cycle with R37 until the meter reads Zero volts
 - 3.11 Adjust R14 until TP4 reads the recorded value
 - 3.12 Adjust R28 until TP8 reads the recorded value
 - 3.13 Check The PC and verify that the Controller / Monitor PAI 1 & 2 current readings agree with the values set at TP4 and TP8
 - 3.14 On the PC set the RF power control to Zero 0 watts and click on set.
 - 3.15 On the PC click on POWER OFF
 - 3.16 Turn Transmitter (1 or 2) AC Power Distribution switch OFF
 - 3.17 Disconnect the Ammeter and Reinstall the JP1 jumper.
 - 3.18 Remove the RF Power Amplifier from the extender fixture and re-install it in the RF section.
 - 3.19 Turn Transmitter (1 or 2) AC Power Distribution switch ON
 - 3.20 On the PC click on POWER ON
 - 3.21 Meter TP7 and on the PC set the RF power for 5 watts.
 - 3.22 Scope the output to the Dummy load and verify The power output is correct $\pm 5\%$
 - 3.23 Verify the PAV being reported by the Controller / Monitor agrees with the TP7 reading
 - 3.24 Continue checking the power accuracy across the allowed power range in 5 watt intervals to 50 watts , 10 watt intervals to 250 watts. Check that Controller / Monitor PAV readings agree with TP7
 - 3.25 On the PC set the RF power control to the maximum allowable output and click on set.



- 3.26 On the PC set Mode to Continuous
- 3.27 On the PC set and increase modulation in steps from 10 to 100% verifying a proper sinusoidal modulation envelope.
- 3.28 With Modulation at 100%, scope the output at the Dummy load and adjust R20 CCW until the shutdown occurs. the Controller / Monitor should indicate a fault condition.
- 3.29 Back off R20 and reset the fault on the PC. Verify Modulated output returns.
- 3.30 Increase Modulation to 120% and adjust R20 CCW again slowly until a shutdown occurs.
- 3.31 On the PC adjust the Modulation to 95%, then set the Mode to IDENT.
- 3.32 Monitor the output for one minute and verify no faults occur
- 3.33 The RF Power Amplifier Alignment is complete

4.3.3 FILTER / BRIDGE ALIGNMENT (FB)

Safety Note: Dangerous RF voltages are present on this PCB during power on tests. Be very careful when working on this board.

1.0 PRELIMINARY SET-UP

- 1.1 Verify that all ac and dc power switches are turned off
- 1.2 Connect a PC to the Controller / Monitor local port with an RS232 null modem cable.
- 1.3 Turn the PC on and Load and Run the Controller / Monitor USER Software supplied with the System
- 1.4 Remove the Filter/Bridge PCB from the RF Section and place it on an extender fixture
- 1.5 Adjust R7 and R11 fully CW
- 1.6 Set jumper JP13 and JP14 to B
- 1.7 Set jumpers JP1 thru JP12 according to the Frequency Band Chart on the Filter/Bridge Schematic (SEP10002 / 0x) sheet 1 of 3.

2.0 POWER BRIDGE BALANCE

- 2.1 Turn The Main AC power switch ON
- 2.2 Turn the Controller / Monitor AC distribution switch ON
- 2.3 Turn the Transmitter (1 or 2) AC distribution switch ON
- 2.4 On the PC screen Click on OPEN PORT
- 2.5 Click on ID CONFIG and set up for the proper Site RF frequency and Tone
- 2.6 Click on Power ON and observe the HV lamp on the PAPS comes on
- 2.7 Click on Control and when the window opens select CARRIER MODE
- 2.8 Set the Carrier Power level to 25 watts



- Note: Forward and reflected power can also be used to trigger fast fault interrupts rather than the slower routine monitoring the controller / monitor accomplishes. It is up to the USER how these should best be set up but the following default settings are factory standard.

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- 3.18 Remove the PCB from the extender and re-install it in the RF Section
- 3.19 Turn the Transmitter (1 or 2) AC power ON
- 3.20 Click on Power ON.
- 3.21 Monitor the System for 2 minutes and verify no faults or shutdowns occur.
- 3.22 Filter /Bridge Alignment is complete.

5 ANTENNAS:

The range of a beacon and antenna depends on many variables and cannot be guaranteed. The field strength can be calculated if the ground conductivity is known, but the field strength needed depends on the background environmental noise which depends on location. A field strength of 70V/m is generally adequate in the United States and Europe but may not be sufficient in latitudes between 30N and 30S. Range figures given in the following sections are based on average ground conductivity and a field strength of 70V/m.

The resistance of the antenna is dependent on many conditions over which the manufacturer has no control. The ground condition, for example, is extremely important. In a high conductivity ground region, the resistance will be fairly low. This is especially true on offshore oil rigs where the ground system consists of a large metal structure over salt water. On the other hand, if the ground conductivity is low, the resistance can become quite large. For example, permafrost in Alaska generally makes a very poor ground and in most cases a special counterpoise system must be used. Without a special counterpoise system, the antenna resistance may be as high as 50 ohms and the antenna efficiency will be very low.

THE MAST ANTENNA, "H" ANTENNA, AND 50-FOOT GUYED MAST ANTENNA ARE HIGH Q, NARROW BANDWIDTH ANTENNAS. THEY SHOULD NOT BE USED FOR VOICE MODULATION. THE SYMMETRICAL "T" ANTENNA IS THE ONLY ANTENNA RECOMMENDED FOR VOICE MODULATION.

5.1 Mast Antenna

The Mast Antenna is a short vertical monopole with capacitive top loading and inductive center loading. It was designed for use where space is severely limited such as on offshore structures. It is centerloaded to be resonant at approximately 500 KHz for operation between 190 and 415 KHz and at approximately 900 KHz for operation between 415 and 625 KHz. Tuning below the resonant frequency is accomplished with the antenna coupler. There are two versions of this antenna; one designed to be mounted on land, the other on drilling platforms or ships. Neither antenna requires guying. A capacitive hat at the top of the 34-foot Mast Antenna consists of six 8-foot radials. These can be shortened if necessary for clearance on drilling platforms. The counterpoise system used for land installations consists of sixteen 60-foot radials made of #10 copper wire with 6-foot ground rods at each end and one in the center. The offshore version of the Mast Antenna uses the platform structure and the water for the ground system.

The range with the Mast Antenna and this transmitter depends on ground condition, frequency, the ADF, and atmospheric noise which in turn depends on location and time. Range for most locations in the United States with one of the lower priced ADF's is from 50 to 70 miles for frequencies above 250 KHz except over low conductivity ground. SAC does not recommend this



antenna for land installations at frequencies below 250 KHz. The "T" Antenna is far superior at all frequencies and should be used whenever space permits. The 50-foot Guyed Mast is recommended for land installations where the "T" cannot be used. Calculated range over sea water with the Mast Antenna and this transmitter is 40 miles at 200 KHz, increasing to 100 miles at 400 KHz.

Ideally, this antenna should be in a clear area; however, this is very seldom feasible on offshore structures. Large obstacles close to the antenna will affect the directional properties and the tuning of the antenna. If possible, the antenna should be installed with a clear area in the direction of the most traffic.

The Mast Antenna is electrically very similar to a 200 pF capacitor in series with a small resistor. See the figure at the end of this section for a plot of the capacitive reactance.

5.2 "H" Antenna

The "H" Antenna is used on the helipad of offshore structures where there is no clear area to install the Mast Antenna. It is a wire structure that is installed on the perimeter of the helipad. The transmitter is mounted directly beneath it so that the vertical portion of the antenna is the offshore structure itself. Electrical characteristics vary, depending mostly on the size of the helipad but are generally similar to the Mast Antenna. Range is also comparable with the Mast in most cases.

5.3 50-Foot Guyed Mast Antenna

This antenna is a guyed vertical monopole with capacitive top loading that was designed for land installations where space is limited. The capacitive top hat consists of six 8-foot radials. The counterpoise system consists of sixteen 60-foot radials made of #10 copper wire with 6-foot ground rods at each end and one in the center. The antenna is guyed at the top and center.

The calculated range with the Guyed Mast Antenna exceeds the Mast Antenna but is less than the "T" Antenna under the same conditions. This antenna is recommended for land installation where space does not permit use of the "T" Antenna.

The Guyed Mast Antenna is electrically very similar to a 300 pF capacitor in series with a small resistor. See the figure at the end of this section for a plot of the capacitive reactance.

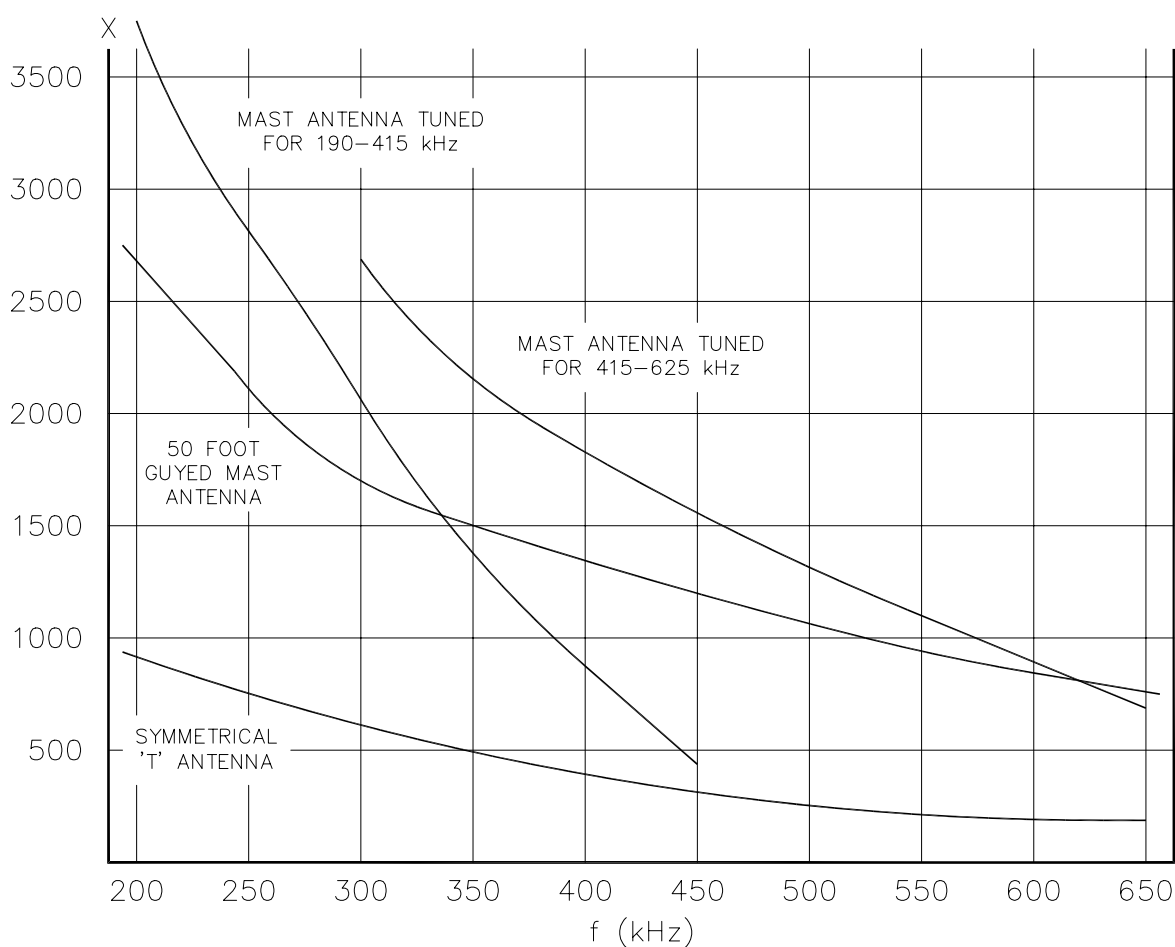
5.4 Symmetrical "T" Antenna

The Symmetrical "T" Antenna is recommended if sufficient land is available. This antenna requires a plot of ground approximately 150 feet by 350 feet.

The calculated range with the "T" Antenna and this transmitter for most locations in the United States and with one of the lower priced ADF's is from 80 to 100 miles except over low conductivity ground.

These range figures are for the standard "T" Antenna with a height of 55 to 60 feet. A long range "T" Antenna with a height of 80 to 85 feet has a range of 100 to 120 miles. If even more range is desired, SAC can supply "T" Antennas with heights up to 200 feet.

The standard "T" is electrically very similar to a 1000 pF capacitor in series with a small resistor. See the figure at the end of this section for a plot of the capacitive reactance.



NOTES: 1. THIS DWG NO. 649 REV. A.

649 - DIAGRAM, ANTENNA REACTANCE



6 PARTS LISTS

SLF31002/00 - ASSY, TRANSMITTER, SD SERIES DUAL (BASIC)

<u>REFERENCE</u> <u>DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
01	SLE10031	ASSY, FINAL TRANSMITTER DUAL (COLD FIRE)
1A1A3	SLP10003	ASSY, PCB, PA POWER SUPPLY
1A1A4	SLP10001	ASSY, PCB, RF POWER AMPLIFIER
4A1A3	SLP10003	ASSY, PCB, PA POWER SUPPLY
4A1A4	SLP10001	ASSY, PCB, RF POWER AMPLIFIER
5A1A3	SLP10007	ASSY, PCB, CF CONTROLLER
5A1A4	SLP10005	ASSY, ANALOG I/O AND AUDIO
5A1A5	SLP10009	ASSY, PCB, DIGITAL I/O AND PWM
5A1A6	SLP10009	ASSY, PCB, DIGITAL I/O AND PWM
5A1A7	SLP10005	ASSY, ANALOG I/O AND AUDIO
5A1A8	SLP10007	ASSY, PCB, CF CONTROLLER
5A2	SLE10004	ASSY, LOAD CENTER (COLD FIRE)



SLE10004 - ASSY, LOAD CENTER (SD SERIES)

<u>REFERENCE</u> <u>DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
A1	SLP10006	ASSY, PCB USER INTERFACE
CB1	9C350021	CIRCUIT BREAKER, 1 POLE, 227 VAC / 65 VDC, 15 AMP
CB2	9C350019	CIRCUIT BREAKER, 2 POLE, 277 VAC, 50/60 HZ, 10.0 AMP
FL1	9F345000	FLTR LINE 2STG 3A FASTON
FL2	9F345001	FLTR LINE 2STG 10A FASTON
FL3	9F345001	FLTR LINE 2STG 10A FASTON
FL4	9F345001	FLTR LINE 2STG 10A FASTON
J1	9R180001	RCPT 110V
S1	9S900005	SWITCH, DPST
S2	9S900005	SWITCH, DPST
S3	9S900005	SWITCH, DPST
TB1	50000011	CONN, BARRIER TERM BLK, 8POS, 142 SERIES



SLE10031 - ASSY, FINAL TRANSMITTER DUAL (SD SERIES)

<u>REFERENCE</u>		
<u>DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
01	SLM10001	ASSY, TRANSMITTER ENCLOSURE (COLD FIRE)
1A1	SLE10033	ASSY, TRANSMITTER (6U) COLD FIRE
4A1	SLE10033	ASSY, TRANSMITTER (6U) COLD FIRE
5A1	SLE10032	ASSY, CONTROL MONITOR DUAL (3U), (COLD FIRE)
J68	56000004	CONN, COAX, PANEL MOUNT, RECPT



SLM10001 - ASSY, TRANSMITTER ENCLOSURE (SD SERIES)

<u>REFERENCE DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
15	4A000000	TERM COPPER "D" 14 AWG SOLID, 4 AWG STRD
18	9F580002	WEATHER STRIP, 1/4THK X 5/8W, BLACK FOAM
19	9R360001	RIVET 3/16" DIA. 1/4"-3/8" GRIP POP CLOSED SS

SECTION 6

SOUTHERN AVIONICS COMPANY

SD SERIES TRANSMITTER



SLM10005 - ASSY, CONTROL MONITOR PANEL WITH APPLIQUE

<u>REFERENCE DESIGNATOR</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>
A1	SLP10016	ASSY, CONTROL MONITOR PCB (COLD FIRE)
XJ1	9J021001	MOUNTING HARDWARE, D-SUB .81 LGTH 4-40 JACK SCREW KIT

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