J1000
1,000 Watt
AM Broadcast
Transmitter

Repair Manual

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Warranty

By Nautel Limited/Nautel Maine Inc.

Nautel Limited/Nautel Maine Incorporated, hereinafter referred to as Nautel, guarantees all mechanical and electrical parts of the equipment for a period of thirteen months from date of shipment.

1. A “Part Failure” is defined as a part that is defective or does not perform as required, provided the following criteria are met:

   (a) When the equipment is operated within the design parameters.
   (b) When the equipment is installed and adjusted according to Nautel’s procedures, as stated in the *Installation and Operation* manual.

2. Nautel shall provide replacement parts at no cost to the customer for all “Parts” that become defective during the warranty period once the defective part has been returned to Nautel.

3. In the event a “Part” fails during the warranty period and causes damage to a sub-assembly that cannot be readily repaired in the field, the entire damaged sub-assembly may be returned to Nautel for repair. Repairs will be made at no charge to the customer.

4. Where warranty replacements or repairs are provided under items 2 or 3, Nautel will pay that part of the shipping costs incurred in returning the part/assembly to the customer.

5. Warranty replacement parts and repairs which are provided under items 2 or 3 are guaranteed for a period of ninety days from the date of shipment, or until the end of the original warranty period, whichever occurs later.

6. Nautel will only assume responsibility for any charges incurred by Nautel employees.

7. Nautel has the privilege of investigating whether failures have been caused by factors beyond Nautel’s control.

8. Nautel is in no way liable for any consequential damages arising from the use of this equipment.

9. When requesting a warranty repair or replacement, please provide complete and accurate information. The procedure for requesting a warranty item is outlined in the paragraph “Equipment Being Returned to Nautel” on page two of this warranty section. The same procedure applies when ordering spare or replacement parts not covered under the warranty.

Customer Service Notice

A ‘Technical Assistance’ and ‘Plug-in Module Exchange’ service is available to Nautel transmitter owners.

Factory Support

TECHNICAL ASSISTANCE
Nautel's field service department provides telephone technical assistance 24 hours a day, seven days a week. Requests via facsimile or e-mail received after Nautel's normal working hours are responded to the next working day. Contact the appropriate field service centre from the following:

U.S.A. customers use:	Nautel Maine Incorporated 201 Target Industrial Circle Bangor, Maine 04401	T.+1.207.947.8200 (24 hours) F.+1.207.947.3693
All other customers use:	Nautel Limited 10089 Peggy's Cove Road, Hackett's Cove, NS, Canada B3Z 3J4	T. +1.902.823.3900 (24 hours) F. +1.902.823.3183 E-Mail support@nautel.com Web www.nautel.com

MODULE EXCHANGE SERVICE
In order to provide Nautel customers with fast and efficient service in the event of a problem, Nautel operates a factory rebuilt module exchange service which takes full advantage of the high degree of module redundancy in Nautel equipment. This module exchange service is operated from Nautel's factory in Bangor, Maine and Hackett's Cove, Nova Scotia. These two locations allow us to provide a quick turn around service to keep our customers on the air. During the transmitter's warranty period, up to thirteen months from shipment, repair and exchange of modules is at no charge to the customer. When the warranty has expired, a charge of 80% of the list price for all exchanged modules is made. If the faulty module is returned to Nautel within 30 days, a credit is issued reducing this charge by one half to 40% of the list price. U.S.A. customers are required to contact our Bangor, Maine facility. Canadian and overseas customers should contact our Nova Scotia, Canada facility.

EQUIPMENT BEING RETURNED TO NAUTEL
For all equipment being returned to Nautel and all requests for repairs or replacements:

- Obtain an RMA number from Nautel (you must have an RMA number to return equipment)
- Mark the item as 'field return'
- Mark the item with the RMA number assigned by Nautel
- Address the item to the appropriate Nautel facility

Please provide complete and accurate information regarding the equipment being returned. This will ensure Nautel can provide prompt attention so that replacement parts can be shipped as soon as possible. Refer to the nameplate on the transmitter and/or the appropriate module/assembly to obtain name, type, part and serial number information. Refer to the parts list of this manual or the appropriate service instruction manual for additional ordering information.

The following information should accompany each request:

* Model of Equipment
* Serial number of Equipment
* Name of Part/Assembly
Serial number of Part/Assembly
* Complete reference designation of Part/Assembly
* Nautel's part number of Part/Assembly
* OEM's part number of Part/Assembly
Number of hours in Use
Nature of defect
* Return shipping address

* Denotes minimum information required to order spare/replacement parts

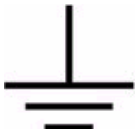
SAFETY

Symbols

General definitions of safety symbols used on equipment or in manuals.

DANGER – HIGH VOLTAGE

Indicates dangerous voltages (in excess of 72 volts), capable of causing a fatal electrical shock, are present on or near parts bearing this label.



GROUND (EARTH)

Used with wiring terminals to indicate the terminal must be connected to earth ground before operating equipment. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electrical shock. Also used on electrical schematics to indicate a part that is connected to earth ground.

GROUND (PROTECTIVE or SAFETY)

Used with protective (safety) conductor terminals to indicate the terminal must be connected to ground before operating the equipment. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electrical shock.

ELECTROSTATIC SENSITIVE

Indicates a part or assembly is or contains devices that are electrostatic sensitive. To prevent damage to these devices, ensure the handling procedures outlined in this manual are observed.

WARNING — A WARNING denotes a hazard. It identifies an operating procedure, condition, etc. which, if not strictly observed or adhered to, could result in injury or death to personnel. Throughout the technical manual, a WARNING shall immediately precede the text to which it applies.

CAUTION — A CAUTION denotes a hazard. It identifies an operating procedure, condition, etc., which, if not strictly observed or adhered to, could result in damage to, or destruction of the equipment. Throughout the technical manual, a CAUTION shall immediately precede the text to which it applies.

NOTE — A NOTE denotes important information pertaining to an operating procedure, condition, statement, etc., which is essential to highlight. A NOTE may precede or follow the text to which it applies.

Artificial Respiration (Mouth-to-Mouth)

1

(a) START MOUTH-TO-MOUTH BREATHING IMMEDIATELY. SECONDS COUNT.
Do not wait to loosen clothing, warm the casualty, or apply stimulants.

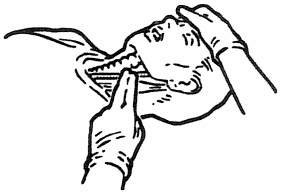
(b) ASSESS RESPONSIVENESS OF CASUALTY. Do not jar casualty or cause further physical injury (**Figure 1)**

2

(c) IF POSSIBLE, SEND A BYSTANDER TO GET MEDICAL HELP.
Do not leave casualty unattended (**Figure 2)**

(d) CHECK CAROTID PULSE (Figure 3)

(e) LAY CASUALTY ON HIS/HER BACK and place any available jacket or blanket under his/her shoulders.



3

(f) TILT THE HEAD BACK AND LIFT THE CHIN to open the airway (**Figure 4)**

(g) PINCH CASUALTY'S NOSE AND EXHALE TWO SLOW BREATHS INTO CASUALTY (Figure 5)

(h) REMOVE YOUR MOUTH and check for breathing **(Figure 6)**

4

(i) CONTINUE GIVING ONE BREATH EVERY FIVE SECONDS without interruption. If any air is retained in the stomach after exhalation by casualty, press gently on stomach to expel air.

(j) IF CHEST DOES NOT RISE CHECK for obstruction in casualty's mouth. Clear foreign material using your finger, tissues, etc. Use chin lift and recommence mouth-to-mouth breathing.

5

(k) WHILE MOUTH-TO-MOUTH BREATHING IS CONTINUED have someone else:
- Loosen casualty's clothing.
- Keep the casualty warm.

(l) DON'T GIVE UP. Continue without interruption until the casualty is revived, or until a doctor pronounces the casualty dead. Four hours or more may be required.

(m) DO NOT PROVIDE ANYTHING ORALLY while victim is unconscious.

6

SAFETY

General Rules for Treatment for Burns, Bleeding, and Shock

1. After casualty has revived, treat for injuries and shock.
2. Reassure casualty.
3. Try to make him comfortable.
4. Keep him reasonably warm but do not apply heat.
5. If thirsty, liquids may be given but no alcohol (no liquids should be given in cases of severe burns).
6. Treat burns or wounds. Infection danger in treating burns or wounds is very great so ensure hands are clean and do not handle affected areas more than necessary.
7. Do not apply salves, grease, etc. to burns.
8. Do not remove burned clothing that adheres to the skin or breaks blisters.
9. Cover the burn with a dry sterile dressing, piece of sheeting, etc.
10. Bandage lightly over blisters where care must be taken to cover and not to break.
11. If wound is bleeding severely, elevate affected area, except in the case of a fracture.
12. Expose wound and apply pressure.
13. Apply dressing, pad and bandage.
14. For burns and bleeding, immobilize injured part using splints if necessary and keep patient in restful position during removal to hospital or expert medical attention.
15. In all cases, send for medical aid immediately.

SAFETY

Electric Shock - Rescue Methods

Electricity can damage the body in a number of ways. It may interfere with the proper functioning of the nervous system and the heart action, subject the body to extreme heat and can cause severe muscular contractions. The path that the current of electricity takes through the body is important. Currents that pass from hand to hand or from hand to foot may pass directly through the heart and upset its normal functioning. This threat to life is related to the amount of current or amperage that will flow through a victim's body. Very little current (as little as 10 mA) can result in severe shock or death.

Speed in the application of first aid measures is absolutely essential in cases of electrical injury. As soon as the victim is freed safely from the source of the electrical current, artificial respiration should be commenced immediately if breathing has stopped. If the carotid pulse cannot be felt, external cardiac massage should be commenced simultaneously. Resuscitation should continue until the patient is breathing on his own or until medical aid arrives. Survival rates can be quite high if cardiopulmonary resuscitation is started within 3 to 4 minutes of the injury being received.

Act At Once - Delay or Indecision May Be Fatal

1. Turn **OFF** the electrical source.
2. Commence artificial respiration immediately.
3. Treat for burns, bleeding and shock.

Removing a Casualty From Electrical Contact

LOW VOLTAGE - 0 to 240 V (household use)

Switch off the current, if possible and time permits. If the switch cannot be located immediately and the supply is through a flexible cord or cable, the current may be shut off by removing the plug or even breaking the cable or wrenching it free. Never attempt to shut off current by cutting cord with a knife or scissors.

If the current cannot be shut off, the greatest care is necessary in removing the casualty. Household rubber gloves, rubber or plastic hose (if there is no water in them), a dry unpainted stick or a clean dry rope can be used to free victim.

HIGH VOLTAGE - 240 V and up (industrial machines and power lines)

Do not touch any person or equipment in contact with a wire.

Use a dry unpainted pole, clean dry rope, dry rubber or plastic water hose to separate the casualty from the contact.

Keep as far away as possible.

Do not touch the casualty until the casualty is free.

SAFETY

Toxic Hazard Warning

There are devices used in this equipment containing beryllium oxide ceramic, which is non-hazardous during normal device operation and under normal device failure conditions. These devices are specifically identified in the equipment parts list(s).

DO NOT cut, crush or grind devices because the resulting dust may be **HAZARDOUS IF INHALED**. Unserviceable devices should be disposed of as harmful waste.

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Release Control Record

Issue	Date	Reason
3.0	01 February 2006	Release 3 of product

J1000
REPAIR MANUAL

Section 1 GENERAL INFORMATION

1.1 PURPOSE AND SCOPE OF MANUAL

The J1000 *Repair* manual provides in-depth component level maintenance and troubleshooting procedures beyond that provided in the *Installation and Operation* manual. These procedures include typical test voltages/waveforms and detailed electrical schematics for all transmitter assemblies. The information in this manual is intended for use by an experienced electronic technician.

1.1.1. Family Tree

The family tree for the J1000 transmitter is depicted in Figure 4-1. It identifies the major assemblies and shows the hierarchical assembly relationship. It also identifies the reference designation assigned to each assembly and where their parts list is located.

J1000
REPAIR MANUAL

Section 2 THEORY OF OPERATION

2.1 INTRODUCTION

The theory of operation for the J1000 AM broadcast transmitter is presented in this section. Unique circuits are explained. Electrical schematics, referenced throughout the text by an SD-#, are located in Section 6.

2.2 TRANSMITTER OVERVIEW

The transmitter operates at one fixed frequency between 530 kHz and 1,610 kHz and provides up to 1,100 W of RF output power. It may be operated locally when co-located with the studio, or remotely when the studio is at a different site. The transmitter circuitry is subdivided into four functional blocks - exciter stage, ac/RF power stage, RF combiner/output filter stage and control/ monitor stage (see Figure 2-1).

2.3 EXCITER STAGE

The exciter stage contains two exciter sections (A and B) that can be selected automatically or by local or remote control. Each exciter generates its own RF frequency source, PDM, and digital control signals for use in the RF power stage. The exciter stage consists of exciter interface PWB (A1A3), RF synthesizer PWBs A (A1A4) and B (A1A6, if installed), interphase PDM driver PWBs A (A1A5) and B (A1A7, if installed), power supply assembly (A1A8) and LVPS buck converter PWB (A1A9). See Figure SD-2.

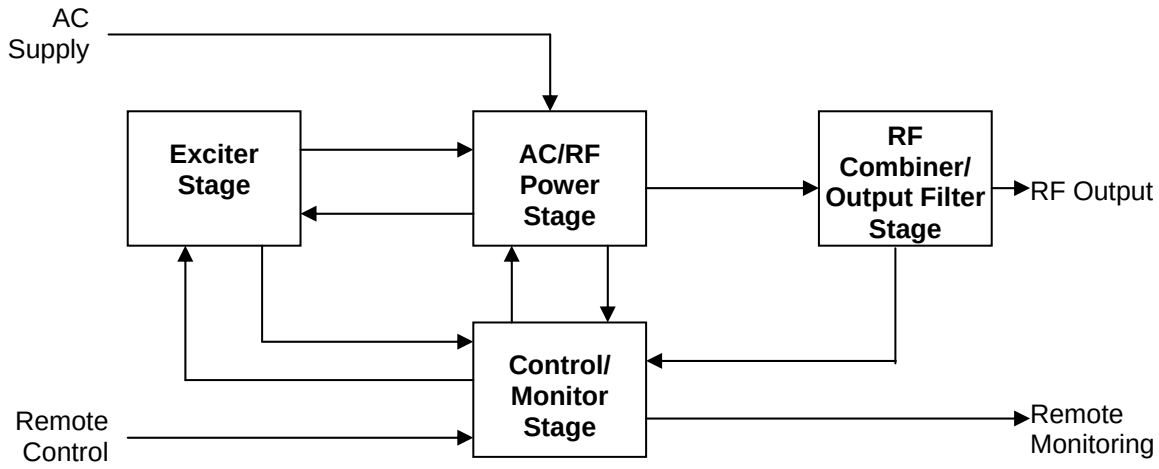


Figure 2-1 J1000 Transmitter Block Diagram

2.3.1 Exciter Interface PWB

The exciter interface PWB (A1A3) provides signal distribution and interconnection for power supply assemblies A and B, RF synthesizer PWBs, and interphase PDM driver PWBs (see Figure SD-11).

2.3.1.1 Exciter Selection

The selection of regulated voltages, carrier frequency signals, and f_{PDM} signals depends on the position of relays K1 and K2. Relays K1 and K2 remain in their de-energized state until a +5 V *Changeover Relay Control* signal is applied to the gate of FET Q2. The ±15 V and ±5 V sources are applied to RF synthesizer PWB (A) and interphase PDM driver PWB (A). The f_{PDM} for the RF power stages is sourced from interphase driver PWB (A). When a +5 V *Changeover Relay Control* signal is present, relays K1 and K2 switch to their energized state enabling the B exciter circuits.

2.3.1.2 RF Drive Monitor

The RF drive (f_C) signal applied by the active exciter is monitored by transistor Q7. If the f_C signal is not present, transistor Q7 turns off and an *RF Osc Fail* signal is applied to the control/monitor function. This will initiate an exciter changeover or transmitter shutback.

2.3.2 RF Synthesizer PWBs

The RF synthesizer PWBs (A1A4 and, if installed, A1A6) use direct digital synthesis (DDS) to generate carrier frequencies within the AM broadcast band (535 kHz to 1,610 kHz). The output of a digital synthesizer integrated circuit with internal high-speed 12-bit digital-to-analog converter is low-pass filtered to provide a sinusoidal continuous output. The sine wave is digitized and divided by a factor of four to obtain the carrier frequency. The digitized sine wave is also divided by a factor of N to obtain a $2f_{PDM}$ frequency that ultimately determines the transmitter's pulse duration modulation (PDM) frequency. The RF synthesizer PWB consists of a microprocessor, direct digital synthesizer, low pass filter, digitizer, IPM correction, balanced drive, and N divider. See Figures SD-12 and SD-13.

2.3.2.1 Microprocessor

The microprocessor consists of an 87C51 integrated circuit (U4), which is clocked at the system oscillator frequency (10.0000 MHz). Firmware resides in U4's internal four kilobytes of EPROM memory. The microprocessor generates control information for the DDS circuit, generates control information for the N divider circuit, and provides the appropriate sequence and control signals to all power modules during transmitter tuning, where required by the host transmitter.

2.3.2.1.1 DDS Control Information

The RF carrier frequency is set using five binary coded decimal (BCD) switches (S1 through S5). When a current-sink-to-ground is applied at the *Reset DDS* input, or during turn on, the *microprocessor* monitors these switches and outputs the appropriate 48-bit value to the DDS Frequency Tuning Word #1 register. The 48-bit value is written in six consecutive bytes to the DDS's six internal registers. The *sclk* signal is enabled on each write cycle.

2.3.2.1.2 N Divider Control Information

The $4f_C/B$ frequency is divided by an 'N' factor to provide $2f_{PDM}$ output frequency between 126 kHz and 134 kHz (when E3 is set in **LOW PDM** mode) or between 245 kHz and 276 kHz (when E3 is set in **HIGH PDM** mode) (see formula below). The microprocessor determines the value of N and outputs the information at pins 2, 3, 4, 5, 6 and 7. The N divider circuit uses this information as the N dividing factor. J1000 transmitters use the **HIGH PDM** mode.

- for f_{PDM} = 130 kHz (HIGH PDM position):

f_C and f_{PDM} are expressed in kHz

$$2f_{PDM} = \frac{4f_C}{\text{int}\left[\frac{2f_C + 65}{130}\right]}$$

2.3.2.1.3 RF Drive Tuning Control

U4 is a microprocessor integrated circuit which monitors the status of control signals provided by the transmitter, where required. It also provides control outputs that enable the RF drive tuning circuits and inhibit the pulse duration modulation (PDM) while the RF drive tuning is enabled. These inputs/ outputs are not applicable to J1000 transmitters.

2.3.2.2 Direct Digital Synthesizer

The direct digital synthesizer consists of integrated circuit U5 (AD98525Q) and associated components. It generates a frequency of $4f_C$ based on information provided by microprocessor U4 (refer to paragraph 2.3.2.1). Integrated circuit U5 is a CMOS, numerically controlled oscillator with a 48-bit phase accumulator and 12-bit digital-to-analog converter (DAC). The phase accumulator, which is responsible for generating an output frequency, is presented with a 48-bit value from the Frequency Tuning Word 1 registers, whose contents determine the FTW as follows:
The 10 MHz clock input is coupled with U5's internal programmable reference clock multiplier. This results in a system clock of 50 MHz (i.e., SYSCLK = 50 MHz).

The 12-bit output from the phase accumulator is input to the DAC, which outputs a stepped sine wave at a frequency of $4f$c. The $4f$c output is then low-pass filtered to remove high frequency components.

2.3.2.3 Low Pass Filter

A low-pass filter consisting of C21, L1, and C23 removes the high frequency images present in the DDS output signal. The output is a sine wave at a frequency of $4f_C$.

2.3.2.4 Digitizer

The output of the low-pass filter is connected to a digitizer circuit consisting of transistor Q4, inverter U10:B, and associated components. Inverter U10:B outputs an approximate square wave at a frequency of $4f_C$, which is applied to a ÷4 circuit and to the N divider circuit.

2.3.2.5 IPM Correction

The incidental phase modulation (IPM) correction circuit is not used in J1000 transmitters. The position of switch element S6:4 determines if the IPM correction circuit is enabled or disabled. The IPM correction circuit should be disabled (switch S6:4 set to the closed position) for a J1000 transmitter.

2.3.2.6 Waveform Symmetry

RF DRIVE SYMMETRY potentiometer R32 is adjusted for an RF drive output waveform, which is a symmetrical square wave (50% duty cycle), as measured at the input to the balanced drive circuit (TP6). The position of **SYMMETRY ADJ** shorting jumper E6 determines when the RF drive symmetry circuit is enabled or disabled. E6 should be installed in the **ENABLE** position (shorting pins 1 and 2) when used in an AM broadcast transmitter.

2.3.2.7 Balanced Drive

The balanced drive buffer is a switching circuit that ensures the rise and fall times of its output square wave are minimal. The f_C signal is a 15 V peak-to-peak square wave that is the low level RF drive signal for the RF power stage of the transmitter.

2.3.2.7.1 Balanced Drive Matching

Shorting shunt post E5 is installed on seven-position header XE5 to choose the optimum capacitor and resistor values. It is installed in the **D** position (shorting pins 7 and 8) for J1000 transmitters.

2.3.2.8 N Divider

The N divider circuit is a cascade counter made up of integrated circuits U6, U7, and inverters U8:A and U8:F. The $4f_C/B$ signal is divided by N to provide a $2f_{PDM}$ frequency, which is between 126 kHz and 134 kHz (when E3 is set in **LOW PDM** mode) or between 245 kHz and 276 kHz (when E3 is set in **HIGH PDM** mode). The value of N is supplied by microprocessor U4 (refer to paragraph 2.3.2.1.2). The $2f_{PDM}$ output, which is nominal 5 V peak-to-peak pulses, is applied to the transmitter's pulse duration modulation (PDM) generation circuit, and ultimately determines the PDM frequency.

2.3.2.9 RF Drive Source Selection
The RF drive source may be provided by the integral numerically controlled oscillator, an external RF generator at fc, or a 10 MHz reference. The position of shorting shunt posts E1, E2 and E4 determine which RF drive source is selected.

2.3.2.9.1 Internal fc Source
When the integral numerically controlled oscillator's output is used as the RF drive source, the shorting shunt posts must be configured as follows:

- E1 in **INT** position (pins 2 and 3 shorted)
- E2 in **INT** position (pins 2 and 3 shorted)
- E4 in **INT** position (pins 2 and 3 shorted)

2.3.2.9.2 External fc Source
When an externally generated carrier frequency is used as the RF drive source, the shorting shunt posts are configured as follows:

- E1 in **INT** position (pins 2 and 3 shorted)
- E2 in **INT** position (pins 2 and 3 shorted)
- E4 in **EXT** position (pins 1 and 2 shorted)

The applied RF must be precisely the carrier frequency (fc) and its peak-to-peak voltage (sine or square wave) must be more than 5.0 V but less than 12.0 V.

2.3.2.9.3 External 10 MHz Source
When an external 10 MHz signal is used as the RF drive source, the shorting shunt posts are configured as follows:

- E1 in **EXT** position (pins 1 and 2 shorted)
- E2 in **EXT** position (pins 1 and 2 shorted)
- E4 in **INT** position (pins 2 and 3 shorted)

Cables are provided in the transmitter's ancillary kit to connect between J7 (and J8, for dual exciters) of the remote interface PWB and J2 of the RF synthesizer PWB(s). The applied RF must be precisely 10.00 MHz and its peak-to-peak voltage (sine or square wave) must be more than 2.2 V but less than 8.0 V.

2.3.3 Interphase PDM Driver PWBs

The interphase PDM driver PWBs (A1A5 and A1A7) produces two pulse trains of variable width as its PDM (*PDM 1* and *PDM 2*) outputs. Each pulse train contains the same data but are offset from each other by one-half their repetition rate. The PDM repetition rate (f_{PDM}) is a fixed frequency normally between 128 kHz and 140 kHz. The frequency is determined by the $2f_{PDM}$ input, which is a derivative of the carrier frequency. These PDM drive signals determine the transmitter output power level, as well as the output modulation level, when applied to the modulator assemblies in RF power modules A and B (see Figure SD-14).

2.3.3.1 Carrier Level Control
The carrier level control circuit consists of U6, U2A, U2D, U3B, U3D, and their associated components. U6 is a four-quadrant analog multiplier connected as a variable gain, wide-band, linear amplifier. The modulation reference (I^1) input is multiplied by a factor determined by the level of the *carrier ref* (I^2) and *B+ ref* (I^4) inputs to determine the gain and, in turn, the I^3 output.

2.3.3.1.1 When there is no *unbalanced audio* input at J1-15, U2D's output (TP6), which is the modulation reference, will be a nominal 1.4 V. When a pure audio sine wave is present at a level that will produce 100% modulation, the output of U2D will be a sine wave varying from 0 V to 3.9 V. The resulting current flow through R12 is U6's I^1 input.

2.3.3.1.2 The *carrier ref* input at J1-2 is a dc voltage directly proportional to the expected RF carrier level squared. When the expected carrier level is the transmitter's rated carrier level, the *carrier ref* input and the output of buffer U2A (TP5) are a nominal 4.7 V. The resulting current flow through R13 is U6's I^2 input.

2.3.3.1.3 The *B+ ref (1)* input at J1-3 is a dc voltage directly proportional to the B+ voltage being applied to the transmitter's RF power stage. When the B+ voltage is 350 V (for high power operation), the *B+ ref (1)* input and, in turn, the output of buffer U3D (TP3), are a nominal 6.1 V. The resulting current flow through R20 is U6's I^4 input.

2.3.3.1.4 The gain of U6 and, in turn, the current flowing from its I^3 output, is determined by the following formula:

$$\frac{I^2}{I^4} \times I^1 = I^3$$

When the *carrier ref* input (I^2) is 4.7 V (transmitter's rated carrier level) and the *B+ ref (1)* input (I^4) is 6.1 V (B+ voltage of 350V), the gain of U6 is 0.76 for the modulating reference applied to I^1. U6's I^3 output current is 0.76 times its I^1 input current. U3B is connected as a less than unity amplifier and its gain is summed with U6's gain. The end result is the total voltage gain of the circuit, relative to the voltage at the output of U2D (1.4 V when no audio is present), is a nominal 0.67 when **GAIN TRIM** potentiometer R31 is set to the centre of its range. When there is no modulation present, the *carrier ref* + *audio* output of U3B (TP8) is 0.94 V (1.4 V x 0.67).

The gain of U6 will change in direct proportion to changes in the *carrier ref* voltage. If the *carrier ref* voltage is set to 0 V, or it is clamped to ground because Q1 is turned on, U6's gain is minimum (zero). In turn, the modulating reference's multiplication factor is minimum (zero). The transmitter's RF output is turned off.

The gain of U6 will change in inverse proportion to changes in the *B+ ref (1)* input. This feature eliminates the need for sophisticated filtering of the transmitter's B+ power supply and maintains the transmitter's RF output at the original level for B+ voltage variations of ±10%.

2.3.3.1.5 GAIN TRIM potentiometer R31 provides a nominal 10% adjustment in the *carrier ref* + *audio* output of U3B. It is adjusted in dual exciter applications to compensate for tolerance differences in the PDM generators of exciter A and exciter B. When it is set properly, the transmitter's RF output is the same when either exciter is selected, provided the same *carrier ref* is being applied.

2.3.3.2 PDM Divider

The PDM divider circuit divides the $2f_{PDM}$ input frequency (J1-7) by two. The resulting f_{PDM} output (J1-10) is a 0 V to 15 V square wave. Unless otherwise established during the transmitter's manufacture, it should be a fixed frequency, nominally 130 kHz.

2.3.3.3 Linear Integrator

The linear integrator circuit converts the f_{PDM} square wave on its input to a triangular waveform at its output. The triangular waveform has negative and positive voltage excursions of equal amplitude and duration. The long R/C time constant formed by C42/R57 ensures a linear rise and fall time. Since the R/C time constant is fixed, the waveform amplitude varies over the frequency range of f_{PDM}. The charge/ discharge time and waveform amplitude are maximum at the lowest frequency.

2.3.3.4 Integrator Peak Detector

The integrator peak detector circuit detects the positive going excursions of the linear integrator's triangular waveform. A portion of the resulting positive dc voltage (nominally 1.8 V) at U8A's output, is applied to the inverting input of differential amplifier U3A. The *carrier ref* + *audio* output of U3A is offset by this voltage which is proportional to the triangular waveform voltage peaks. This offset effectively sets the *carrier ref* + *audio*'s zero power reference to the triangular waveform's peak voltage. This technique ensures no RF output is produced when the *carrier ref* input (J1-2) is 0 V. It also ensures the RF output is reduced to near 0 W at the 100% modulation envelope valleys when operating at the transmitter's rated carrier level.

2.3.3.5 Interphase PDM Generator
The interphase PDM generator consists of two variable pulse duration generators (PDM1 and PDM2). Both produce identical 0 V to +15 V rectangular waveforms at the f_{PDM} repetition rate, but they are offset from each other by one half of the repetition rate. The waveform on/off ratio (duty cycle) is directly proportional to the carrier level and amplitude of the modulating audio. The transmitter utilizes three B+ voltage levels to maximize performance. As the RF output power is increased from 0 W (B+ voltage is 150 V), the PDM duty cycle increases proportionally. When the RF output is increased to a level where the PDM duty cycle reaches 45%, the controller/display PWB initiates a B+ voltage increase (to 250 V) and a PDM duty cycle decrease (to 27%). When the RF output is increased to a level where the PDM duty cycle again reaches 45%, the controller/ display PWB initiates a B+ voltage increase (to 350 V) and a PDM duty cycle decrease (to 32%).

2.3.3.5.1 PDM1 Generator
The PDM1 generator consists of U10B, Q4, Q5, and their associated components. The compensated *carrier ref* + *audio* input from the integrator peak detector circuit is applied to differential amplifier U10B's non-inverting input, where it is compared to the triangular waveform from the linear integrator circuit. When the compensated *carrier ref* + *audio* is more positive than the triangular waveform, U10B's output is an open collector. +15 V is applied through R60 and R62 to the balanced drive formed by Q4/Q5. Q4 turns on and applies +15 V to K1-3 as the PDM1 output (Q5 is off). For the remainder of the triangular waveform's period, the compensated *carrier ref* + *audio* is less positive than the triangular waveform. U10B's output is a current-sink-to -15 V and Q4 turns off. Q5 turns on and clamps the PDM1 output to ground. The minimum 'on time' (zero RF power) occurs at the negative peaks of the triangular waveform. See Figure 2-2 for a timing diagram.

2.3.3.5.2 PDM2 Generator
The PDM2 generator consists of U3C, U11B, Q6, Q, and their associated components. It operates similar to the PDM1 generator except U3C inverts the compensated *carrier ref* + *audio* input and applies it to differential comparator U11B's inverting input. The result is a PDM2 'on period' when the compensated *carrier ref* + *audio* is less positive than the triangular waveform and produces a minimum 'on time' at the positive peaks of the triangular waveform. The on/off ratio of the PDM1 and PDM2 outputs are the same, but the zero power reference change for the PDM2 output is offset, relative to the PDM1 output, by one half of the PDM repetition rate.

2.3.3.6 PDM Fault Detector
The PDM fault detector circuit contains two identical voltage controlled switches (one for each PDM output) that control the 'set/'reset' status of the shutback latch circuit and, in turn, controls the on/off status of relay K1. For explanation purposes, only the PDM1 fault detector is described.

2.3.3.6.1 The PDM1 fault detector circuit consists of U12A and its associated components. R67/C58 form an integrator with a long time constant, relative to the PDM frequency. C58's charge voltage is applied to U12A's inverting input and compared to the 7.3 V reference voltage applied to its non-inverting input from voltage divider R70/R71/ R72. U12A's output is an open collector and has no influence when C58's charge voltage is less positive than the reference voltage. U12A's output will switch to a current-sink-to-ground when C58's charge voltage goes more positive than the reference voltage.

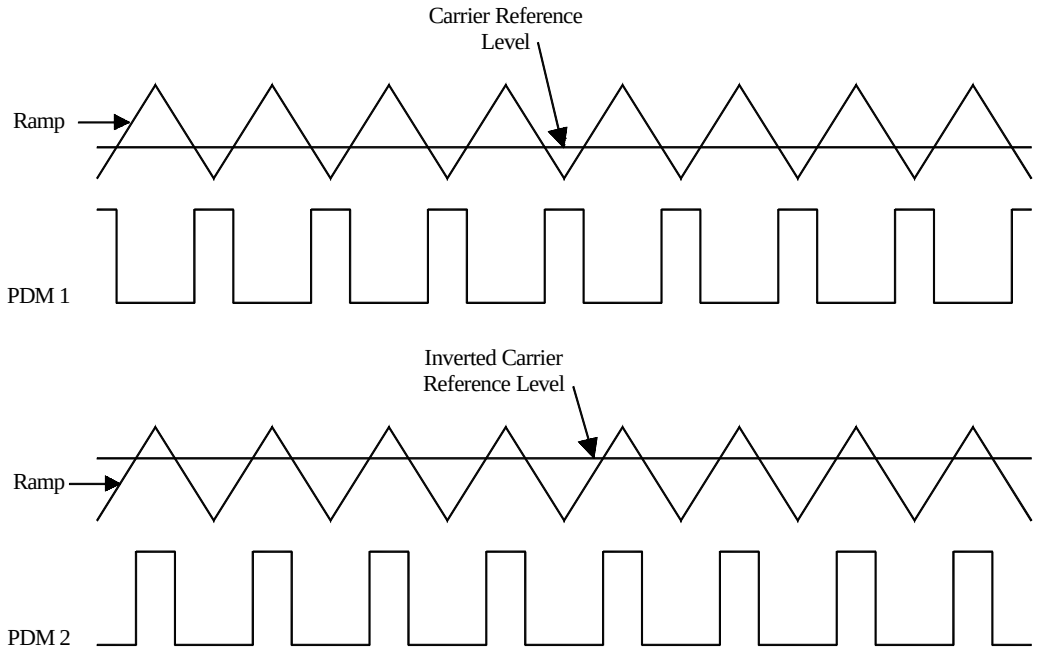


Figure 2-2 Timing Diagram for PDM Differential Amplifier

2.3.3.6.2 During normal operation, C58 will charge through R67 towards 15 V when the PDM1 output is 15 V (during its 'on time') and CR3 is reversed biased. It will instantly discharge to ground potential, through CR3, when the PDM1 output switches to 0 V (during its 'off time'). The repetition rate of the PDM1 on/off periods ensures the charge on C58 will not exceed 7.3 V, provided each PDM1 cycle contains an 'off time'. If a PDM failure occurs that produces a continuous 'on time', C58 will charge more positively than 7.3 V. U12A's output will switch to a current-sink-to-ground and toggle the shutback latch circuit to its 'set' state.

2.3.3.7 Shutback Latch

The shutback latch circuit inhibits the 'on time' of the PDM outputs and, in turn, the RF output of the transmitter whenever a transmitter originated *Inhibit PDM* (J1-16) command is applied. This circuit provides additional protection to the transmitter's RF power stages when faults are detected or actions are initiated that may cause RF stress current thresholds to be exceeded. Its function is to de-energize K1 and disconnect the *PDM 1*/*PDM 2* outputs from the transmitter circuits when the PDM fault detector output is a current-sink-to-ground (logic low). It also inhibits the PDM generators when relay K1 is de-energized or when a logic true *inhibit PDM* command is applied to J1-16.

U9A/U9B form a bistable flip/flop. The flip-flop's output, at U9-3, will be 15 V (logic high) when in its 'reset' state, and a current-sink-to-ground (logic low) when in its 'set' state.

Normally the *inhibit PDM* input and the output of the PDM fault detector circuit, which are the flip-flop's controlling inputs, are open collector. 5 V (logic high) are applied to U9-1 and U9-5 through their pull-up resistors and the flip-flop is latched in its 'reset' state. Relay K1 is held energized and the PDM outputs are applied to the transmitter circuits.

If a PDM fault is sensed, the PDM fault detector circuit applies a current-sink-to-ground (logic low) to U9-5 and causes the flip-flop to switch to and latch in its 'set' state. Relay K1 de-energizes and disconnects both PDM outputs from the transmitter circuits. The *PDM latch* output (J1-11) is activated

(5 V). This condition is maintained until the flip-flop is reset by the removal of the logic low from U9-5 (no PDM fault) and the application of logic low to U9-1 (a logic true current-sink-to-ground *reset PDM* command is applied to J1-1).

2.3.3.8 PDM Inhibit
The PDM inhibit circuit consists of U9D, Q2, Q3, and their associated circuits. Its function is to instantly clamp the output of both PDM generators to ground (zero carrier level) whenever a logic true (current-sink-to-ground) *inhibit PDM* input is applied to J1-16, or when the PDM fault detector circuit senses a PDM fault and the shutback latch circuit's flip-flop is latched in its 'set' state. When neither of these conditions are true, the PDM inhibit circuit has no influence.

2.3.3.9 Dump Circuit
The dump circuit consists of operational amplifiers U2C, U8C, U8B, and associated components. The carrier insertion voltage at TP6 (nominally 1.4 V plus modulating audio) is applied to the inverting input of amplifier U8C (gain = 33.2) via unity gain amplifier U2C. When the modulating audio crosses the threshold on U8C's non-inverting input, established by **DUMP** potentiometer R59, U8C generates a positive voltage burst for use by the transmitter's RF power stage.

2.3.4 Power Supply Assembly
The power supply assembly (A1A8) is a 100 W, universal input, 24 V output power supply. The transmitter's ac input is applied to the CN1 connector and the regulated 24 V output is provided on the CN2 connector. From there it is applied as the dc input source for the LVPS buck converter PWB.

2.3.5 LVPS Buck Converter PWB
The LVPS buck converter PWB (A1A9) accepts the 24 V supply from the power supply assembly and provides regulated ± 15 V and ± 5 V supplies for the exciter stage and the remaining functional blocks of the transmitter (see Figure SD-15).

2.3.5.1 Dc-Dc Converter
Q1 and Q2 are fixed frequency power switching regulators. Their PWM signal outputs determine the output voltage. Q1 generates the ± 15 V supplies and Q2 generates the ± 5 V supplies. Feedback applied to pin 1 of each device adjusts the pulse width to regulate the output voltage.

2.3.5.2 Ac Sample
The ac supply voltage is applied to the primary of sample transformer T1. Diodes CR8 and CR18, capacitor C5, and resistors R5, R6, and R11 provide a half-wave rectified, attenuated sample of the ac signal at J2-29 and J2-30. This sample is used by the transmitter for control and display purposes.

2.3.5.3 LVPS Failure Detector
The half-wave rectified ac signal is also applied to an LVPS failure detection circuit. This circuit consists of comparators U1A and U1B, opto-coupler U2, and associated components. Zener diodes CR15 and CR16 regulate the ac signal to 9.4 V, which is used to apply a high limit reference voltage (3.4 V) to U1A's negative input and a low limit reference voltage (2.7 V) to U1B's positive input. Each of the low voltage power supplies are scaled and applied to both the high and low limit detectors. If a low voltage supply increases or decreases beyond acceptable limits, the output of the associated detector will switch to an open collector. Opto-coupler U2 will turn on and apply a ground potential (0 V) to the *LVPS Fail* output for that PWB.

2.4 AC/RF POWER STAGE

The ac/RF power stage (see Figure SD-3) contains two RF power modules (A and B). Circuitry within the RF power modules convert the transmitter's ac input to the B+ dc supply used by the RF power modules.

2.4.1 RF Power Modules

Each RF power module (A2A1 and A2A2 see Figure SD-16) contributes up to 550 W unmodulated RF carrier power to the transmitter's RF output. Each RF power module contains a wideband RF amplifier, a modulator, and a modulator filter. A forward converter PWB is provided to convert the ac input voltage to the high level B+ voltage used by the modulator assembly. A power module interface PWB is provided to interface control/monitor signals between the RF power modules and the exciter interface PWB as required. The RF power module outputs are applied to the RF combiner/filter stage.

2.4.1.1 Forward Converter PWB

The forward converter PWB (A1 - see Figure SD-17) is a switch mode power supply that converts the transmitter's 170-270 V ac input voltage to the B+ voltage (350/250/150 V) used by the modulator.

2.4.1.1.1 Rectifier

The ac input voltage is rectified by diodes U1 and U2, providing a dc voltage across capacitors C12 through C17. Varistors RV1 through RV3 provide protection from high voltage transients. **AC IND** lamp DS1 provides a status indication of the ac voltage on the RF power module.

2.4.1.1.2 Switching Signal

IC U3 is a high current FET driver that provides a switching PWM signal (0-18 V) to the primary of transformer T2. The secondaries of T2 control the on/off status of FETs Q1 and Q2, which in turn switch the rectified ac voltage to the primary of step-up transformer T1.

2.4.1.1.3 B+ Voltage

The secondaries of step-up transformer T1 are rectified by diodes CR9, CR10, CR11, CR13, CR14, and CR15. These voltages are applied through chokes L4, L5 and L6 and combine to form the high level B+ voltage at the dc output (J4-1). Samples of the B+ voltage (resistors R9, R26 and R27) and current (transformer T3 and associated components) are applied to inputs of current mode PWM controller U8, which provides PWM switching information to regulate the B+ voltage. FETs Q4, Q5 and resistors R10, R24 and R25, in conjunction with opto-couplers U4 and U6, provide a means to adjust the attenuated voltage applied to U8, thereby adjusting the level of the B+ voltage.

2.4.1.1.4 Inhibit

When an RF power module fault occurs, an *inhibit* signal (0 V) is provided to J1-7. Opto-coupler U7 turns off and inhibits the B+ voltage via U8. Opto-coupler U9 turns off causing FET Q7 to be biased off.

2.4.1.1.5 Temperature

Temperature sensor U11, operational amplifier U5:A and associated components form a temperature monitoring circuit for the RF power module. A dc voltage, representative of the temperature, is applied to Temperature output (J1-12).

2.4.1.2 Power Module Interface PWB

With the exception of the B+ input to the modulator, the power module interface PWB (A2) provides the input and output connections for the associated RF power module's power amplifier and modulator.

2.4.1.3 Modulator

The modulator assembly (A3) is effectively a logic level converter that converts the low level (0-15 V) logic of the *PDM* input to a high level (0-B+) logic *PDM (B+)* output.

2.4.1.3.1 13 V Power Supply

The 15 V *LO* output (pin 1) of FET driver U1 is full-wave rectified by the bridge rectifier formed by CR1 through CR4, at the PDM frequency. The resultant dc voltage is filtered by capacitor C7 and limited to 13 V by zener diode CR5.

The power supply's less positive output is referenced to the source terminal of power MOSFET Q1 via resistor R7. Therefore, the positive output is always 13 V more positive than the voltage on the FET source terminal. The 13 V output is applied to the V_B (+) and V_S (-) inputs of FET driver U1 as the switched gate drive for the power MOSFETs. Transformer T1 provides isolation between the high and low level signals.

2.4.1.3.2 FET Driver

FET driver U1 is an integrated circuit configured to produce outputs as follows:

- When the H_{IN} input is high (+1 5 V), H_O output is the dc voltage applied to V_B input.
- When the H_{IN} input is low (0 V), H_O output is the reference voltage applied to V_S input.

The H_O output, which contains the PDM data, is applied to the gate of power MOSFET Q1 as its on/off control.

2.4.1.3.3 B+ Switching MOSFET

Power MOSFET Q1 is connected to switch the B+Vdc on and off at the on/off ratio of the PDM data on U1's H_O output, which is applied to its gate. The resultant *PDM (B+)* output contains the PDM data applied to J2-7 at a high (0-B+) logic level. Free-wheeling diode CR6 prevents negative overshoot by providing current flow when MOSFET Q1 is switched off.

2.4.1.3.4 Dump Circuit

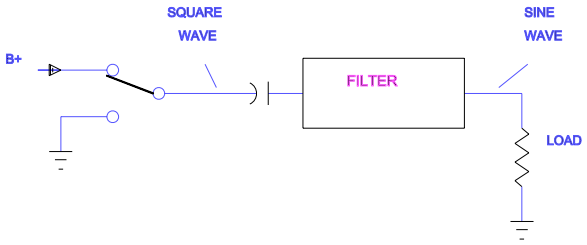
The dump circuit consists of FET Q2 and associated components. During high trough modulation peaks, the average current flowing into the modulator filter is low and the drain-source capacitance of modulator MOSFET Q1 becomes a finite factor in transmitter linearity. A pulse is applied to the modulator's *dump* input (J2-9) during the -95% to –100% modulation intervals to discharge the residual capacitance on MOSFET Q1.

2.4.1.4 Modulator Filter PWB

The modulator filter PWB comprises inductors L1 through L3 and capacitors C1 through C3 as well as C2 of the power amplifier (A5). These components form a low pass filter designed to pass the audio components but reject the PDM frequency. When no modulating audio information is present, the *PA Volts* output will be a dc voltage equal to the modulator input voltage multiplied by the duty cycle of the PDM (B+) signal. Capacitor C5 in conjunction with L3 is resonant at a frequency to provide optimal rejection of the PDM frequency.

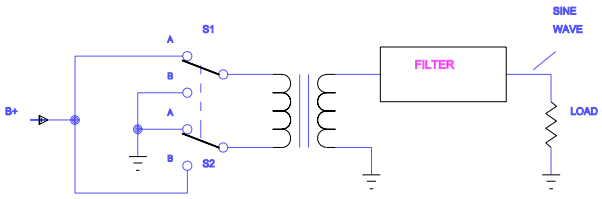
2.4.1.5 Power Amplifier

The power amplifier (A5) uses two parallel-connected pairs of MOSFETs (Q1 through Q4) to produce an unfiltered, modulated RF output. The MOSFETs are connected as cascode or 'H' bridge class 'D' amplifiers, which switch the *PA volts* at the RF drive frequency (refer to Figure 2-3 for a description of class D operation using power MOSFETs). RF drive splitter transformer T1 splits the *RF drive* signal and applies it to MOSFETs Q1 through Q4 with the required phase relationship. Diodes CR1 through CR4 prevent the output of the RF amplifier from going negative. Transistor Q5 and associated components detect the RF drive level and provide an alarm signal to the controller/display PWB. Resistors R5 through R7 provide a *PA Volts Sample* for front panel monitoring.



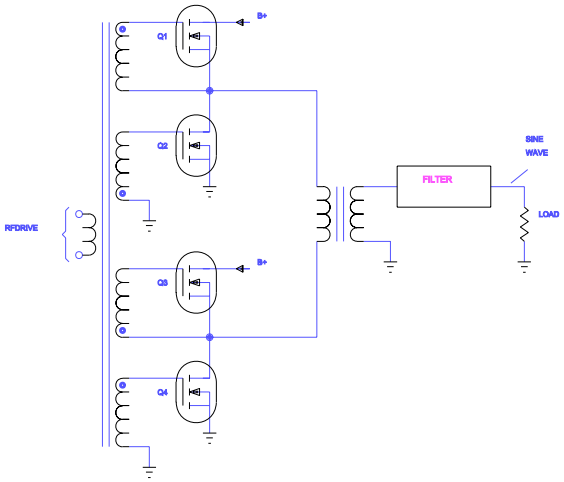
SIMPLE CLASS 'D' OPERATION

If the switch is opened and closed with a 50% duty cycle, a square wave at the switching frequency will result at the filter input. If the filter is designed to pass the switching frequency, but attenuate its harmonics, a sine wave is applied to the load.



PUSH-PULL CLASS 'D' OPERATION

If S1 and S2 are opened and closed with a 50% duty cycle, a square wave of current, at the switching frequency, is passed through the primary of the transformer and transformed to its secondary. If the filter is designed to pass the switching frequency, but attenuate its harmonics, a sine wave is applied to the load.



POWER MOSFET CLASS 'D' OPERATION

Power MOSFETs can be used to replace the switches as depicted in the simple class 'D' operation and push-pull class 'D' operation examples. Note that the switch contacts are replaced by the phase-oriented secondaries of an RF drive transformer. Q1 corresponds to S1-A, Q2 to S1-B, Q3 to S2-B and Q4 to S2-A, as depicted in the push-pull class 'D' operation example. Q1 and Q4 turn on/off together and Q2 and Q3 turn on/off together.

Figure 2-3 Simplified Principles of Class 'D' Operation

2.5 RF COMBINER/FILTER STAGE

The RF combiner/filter stage contains an RF combiner and a bandpass filter that produce the transmitter's final RF output (see Figure SD-3). A forward/reflected power probe and an RF current probe provide samples of the transmitter's RF output, forward power, reflected power and RF current.

2.5.1 Hybrid Combiner/Matching Transformers

The outputs of the two RF power modules are applied to hybrid combiner transformer T1. The combined output of transformer T1 is applied to matching transformer T2, which steps up combiner transformer T1's output impedance from 25 Ω to 50 Ω. When the RF signals applied to combiner transformer T1 are of equal amplitude and phase, no signal is applied to the *Reject Load* output (J2). When an amplitude or phase difference occurs, an RF voltage proportional to that difference is applied to the *Reject Load* output (J2). An external load connected to J2 will dissipate the reject power.

2.5.2 RF Output Filter

The output of the hybrid combiner is applied, via RF filter input PWB A2A3, to an RF output filter. The RF output filter, consisting of capacitors C1 through C3 and inductors L1 through L3, is a band pass filter with a series trap tuned to the carrier frequency's third harmonic. Its nominal input and output impedance is 50 Ω and it has a loaded Q of '2'. The filter removes unwanted harmonics from the hybrid combiner's output and provides the transmitter's final *RF output* (J1). The filter also contains an RF current probe and a forward/reflected power probe. These probes monitor the RF and provide outputs that are monitored by protection circuits. Transient suppressor zener diodes A2A4CR4 through A2A4CR9 provide transient protection for the RF output.

2.5.3 RF Current Probe

The RF current probe circuitry, located on the RF filter input PWB (A2A3), monitors the RF current applied to the RF output filter and produces an RF voltage proportional to the RF current. This voltage is applied to A2A4J1-11 as the *RF current sample* output. The *RF current sample* output is applied to the controller/display PWB's high RF current detector and metering circuit. This high RF current detector produces a high RF current alarm and causes the transmitter's RF output to shut back (turn off) when the RF current exceeds a threshold that represents the maximum stress current for the RF power modules.

2.5.4 Forward/Reflected Power Probe

The forward/reflected power probe circuit, located on forward/reflected power probe PWB A2A4, consists of 20:1 RF current transformer T1, 80:4 RF voltage transformer T3 and associated components. These transformers form the current and voltage arms of a forward/reflected power bridge, which samples the RF output.

The current flowing into the RF output passes through transformer T1's primary. The current in T1's secondary develops a voltage across resistors R3 through R7 that is proportional to the RF output current. The anti-phase voltage across the secondary of RF voltage transformer T3 is applied (summed) to the centre-tap of T1's secondary. When the RF output impedance is precisely 50 Ω, the RF current waveform is in-phase and of equal amplitude to the RF voltage waveform on one half of T1's center-tapped secondary and equal amplitude, but 180° out-of-phase on the other half.

The in-phase voltages are summed, rectified by CR4, low-pass filtered by L3/C2/L4, resulting in a dc voltage being applied to the *Fwd Pwr Sample* output (J1-1). This voltage is proportional to the RF output's forward power level.

The out-of-phase voltages are summed, rectified by CR1, low-pass filtered by L1/C1/L2, resulting in a dc voltage being applied to the *Refld Pwr Sample* output (J1-5). This voltage is proportional to the RF output's reflected power level.

T3's secondary voltage, which is a true sample of the RF output's voltage waveform, is also applied to the *RF Sample* output (J1-9). This output is applied to the remote interface PWB's **RF MONITOR OUT** BNC to allow for monitoring by a modulation monitor and test equipment during maintenance.

2.6 CONTROL/MONITOR STAGE

The control/monitor stage (see Figure SD-1) consists of the front panel metering, controller/display PWB, and remote interface PWB.

2.6.1 Front Panel Metering

The front panel of the exciter/control assembly (A1) provides local controls and a graphic user interface to display operating status, root cause fault detection, RF power, and critical dc voltage/current levels. The front panel is divided into three sections – system diagram, diagnostic display and control.

2.6.1.1 System Diagram

The system diagram is a functional flow diagram of the transmitter. Each section of the flow diagram contains an alarm lamp, which turns on when a fault occurs in that section. Refer to Section 3 of the *Installation and Operation* manual for a description of each lamp. If a lamp is flashing, the transmitter has entered a cutback (reduced power) mode of operation. The lamp that is flashing is likely the cause for the cutback.

2.6.1.2 Diagnostic Display

The diagnostic display is a graphic user interface (GUI) that is navigated using five soft-keys. The majority of the transmitter's local control (exciter selection, power level, etc.) and monitoring (critical parameter levels, alarm events, etc.) may be performed from menus on this display. Refer to Section 3 of the *Installation and Operation* manual for a detailed description of the diagnostic display.

2.6.1.3 Control Switches

The control switches determine the transmitter's control location (local or remote) and its RF status (on or off).

2.6.1.3.1 Local/Remote Selection

When **Local** is selected, all remote control functions, except RF off, are disabled and have no influence on the transmitter's operating status or pre-set RF power levels. When **Remote** is selected, all front panel control functions, except **RF Off**, are disabled and have no influence on the transmitter's operating status or pre-set RF power levels.

2.6.1.3.2 RF On/RF Off Selection

When **RF On** is selected (enabled in **Local** mode only), the transmitter's RF power stage is enabled to provide an RF output. When **RF Off** is selected (enabled in **Local** and **Remote** modes), the transmitter's RF power stage is inhibited.

2.6.2 Controller/Display PWB

The controller/display PWB (A1A1 - see Figures SD-4 through SD-7) performs the following functions:

- Produces dc voltage *carrier reference* outputs that determine the forward power (RF carrier) level of the RF output. These voltages are the reference voltages for variable pulse duration modulation (PDM) generators in the exciter stage.
- Monitors critical parameters and causes the *carrier reference* voltage to turn off (shutback) or reduce (cutback) when fault threshold limits are exceeded.
- Identifies out-of-tolerance parameters when the carrier level is shutback/cutback by providing a local visual indication or a remote electrical status output.
- Selects the exciter (A or B) that will provide the RF drive and PDM drive to the RF power stage's RF amplifiers.
- Determines RF power stage on/off status.
- Interfaces with the front panel's diagnostic display.

2.6.2.1 Carrier Reference Voltage

The *carrier ref (A)* (J4-14) and *(B)* (J4-16) outputs are applied to the interphase PDM driver PWB of each exciter to generate the PDM drive pulse that ultimately controls the RF output of the transmitter. Micro-controller U4 produces variable pulse width, 100 kHz signals as the source for the *carrier ref* outputs. The carrier reference filter consists of operational amplifiers U7A, U7B and associated components to form a Bessel filter with a nominal 5 Hz cut-off frequency. The carrier reference filter is provided to remove all switching components from the carrier reference line.

2.6.2.2 Alarm Threshold Circuits

Certain parameters that are monitored by the controller/display PWB can initiate an alarm indication and appropriate transmitter control if an out of tolerance condition occurs.

2.6.2.2.1 Ac Supply Voltage

The *Ac Pwr* input (J4-22) is an unregulated dc voltage that is proportional to the ac power source voltage. The input is filtered and buffered (by operational amplifier U24D) and compared to a pre-determined *low ac ref* fault threshold (on operational amplifier U27C). If the *Ac Pwr* voltage falls below this threshold, the *carrier ref (A)* and *(B)* outputs are clamped to 0 V and the *shutback (A)* (J5-1) and *(B)* (J5-2) outputs will switch to 0 V and inhibit the exciter stage's modulator drive. The transmitter's RF output is turned off (shutback) and will remain off until the ac power voltage is restored to an acceptable voltage. The system diagram's **AC Mains** lamp will display a fault condition. An *Ac Sample* signal is applied to A/D converter U28 for application to the front panel's diagnostic display.

2.6.2.2.2 Reflected Power Monitor

The *refld pwr* input (J7-4) is a dc voltage that is proportional to the reflected power sensed at the transmitter's output. The input is filtered and applied to the *Ext Refld Pwr Sample* output (J1-5) for remote monitoring.

The signal is then buffered (by operational amplifier U33A) and compared to a pre-determined *refld pwr shtbk ref* fault threshold (on operational amplifier U35A). When the reflected power exceeds 150 W, the *refld pwr* input is more than the fault threshold. The *carrier ref (A)* and *(B)* outputs will be clamped to 0 V and the *shutback (A)* (J5-1) and *(B)* (J5-2) outputs will switch to 0 V and inhibit the exciter stage's modulator drive. A clock pulse is also applied to an alarm count/cutback circuit in complex programmable logic device (CPLD) U14. The RF output will instantly shut back (turn off). This signal is also monitored by operational amplifiers U35B and U35C, which determine the amount of cutback applied to the RF output. The system diagram's **Output Network** lamp will display a fault condition. A *Refld Pwr Sample* signal is applied to A/D converter U28 for application to the front panel's diagnostic display.

Turning off the RF output will result in the *refld pwr* input being reduced to 0 V. The *carrier ref (A)* and *(B)* outputs are restored to their pre-shutback levels, the *shutback A* and *B* outputs return to open collector, and the RF output is restored at an exponential rate. If the fault threshold is exceeded before the pre-set power level is reached, the shutback cycle is repeated. If four or more shutback cycle clock pulses are applied within any five-second period, the *carrier ref* outputs is cutback (reduced) until the carrier level is cutback (reduced) to a level that results in an acceptable reflected power. When the transmitter has entered cutback mode, the system diagram's **Output Network** lamp will flash on and off. When the *refld pwr* input returns to or is maintained at a level that is less than the fault threshold, the s*hutback* outputs will return to open collector but the system diagram's **Output Network** lamp will continue to display a fault as a maintenance aid. The lamp will remain on until reset by the diagnostic display menu.

2.6.2.2.3 RF Current Monitor

The *RF current* input (J7-8) is an RF voltage that is proportional to the total RF current being applied to the RF output filter by the RF power modules. The input is filtered and buffered (by operational amplifier U33B) and compared to a pre-determined *RF current ref* fault threshold (on operational amplifier U35D). When the RF current exceeds the fault threshold, the *carrier ref (A)* and *(B)* outputs are clamped to 0 V and the *shutback (A)* (J5-1) and *(B)* (J5-2) outputs will switch to 0 V and inhibit the exciter stage's modulator drive. A clock pulse is also applied to CPLD U14's alarm count/cutback circuit. The RF output is instantly shutback (turned off). The system diagram's **Output Network** lamp will display a fault condition. An *RF Current Sample* signal is applied to A/D converter U29 for application to the front panel's diagnostic display.

Turning off the RF output will result in the *RF current* input being reduced to 0 V. The *carrier ref (A)* and *(B)* outputs are restored to their pre-shutback levels, the *shutback A* and *B* outputs return to open collector, and the RF output is restored at an exponential rate. If the fault threshold is exceeded before the pre-set power level is reached, the shutback cycle is repeated. If four or more shutback cycle clock pulses are applied within any five second period, the *carrier ref* outputs are cutback (reduced) until the carrier level is cutback (reduced) to a level that results in an acceptable RF current level. When the transmitter has entered cutback mode, the system diagram's **Output Network** lamp will flash on and off. When the *RF current* input returns to or is maintained at a level which is less than the fault threshold, the s*hutback* outputs will return to open collector but the system diagram's **Output Network** lamp will continue to display a fault as a maintenance aid. The lamp will remain on until reset by the diagnostic display menu.

2.6.2.3 Sample Monitoring Circuits

In addition to the parameters described in paragraph 1.6.2.2, various parameters are applied to the controller/display PWB for local (via the front panel's diagnostic display) and/or external (via the remote interface PWB) monitoring. In most cases, these parameters also have associated alarm detection circuitry, but it is not resident on the controller/display PWB.

2.6.2.3.1 B+ Voltage

The *B+ (A)* (J4-24) and *B+ (B)* (J4-26) inputs are dc voltages which represent the positive dc voltage applied to RF power modules A and B as their high current voltage source. The inputs are filtered and buffered by operational amplifiers U24B and U37A. *B+ (A) Sample* and *B+ (B) Sample* signals are applied to A/D converter U29 for application to the front panel's diagnostic display. The ORed output of the *B+ sample* inputs is applied to the *Ext B+ Sample* output (J1-19), then applied to the remote interface PWB for external monitoring.

2.6.2.3.2 PDM Drive

The *PDM (A)* (J4-10) and *PDM (B)* (J4-12) inputs are pulses which represent the PDM signal applied to RF power modules A and B. The inputs are buffered by operational amplifiers U36D and U36B and then filtered through operational amplifiers U38B and U38D and associated components. *PDM (A) Sample* and *PDM (B) Sample* signals are applied to A/D converter U28 for application to the front panel's diagnostic display.

2.6.2.3.3 Dc Current

The *Dc Current (A)* (J8-19) and *Dc Current (B)* (J8-39) inputs are dc voltages which represent the dc current being drawn by RF power modules A and B. The inputs are buffered by operational amplifiers U36A and U36C and then filtered through operational amplifiers U38C and U38A and associated components. *Dc Current (A) Sample* and *Dc Current (B) Sample* signals are applied to A/D converter U28 for application to the front panel's diagnostic display. The ORed output of the *Dc Current Sample* inputs is applied to the *Ext Dc Current Sample* output (J1-17), and then applied to the remote interface PWB for external monitoring.

2.6.2.3.4 PA Voltage

The *PA Volts (A)* (J4-6) and *PA Volts (B)* (J4-8) inputs are dc voltages which represent the voltage applied to the power amplifiers in RF power modules A and B. The inputs are buffered by operational amplifiers U33C and U33D and then filtered through operational amplifiers U37B and U37D and associated components. *PA Volts (A) Sample* and *PA Volts (B) Sample* signals are applied to A/D converter U29 for application to the front panel's diagnostic display.

2.6.2.3.5 Forward Power

The *Fwd Pwr* input (J7-2) is a dc voltage that represents the forward power at the transmitter's RF output. The input is buffered by operational amplifier U32D and then filtered through operational amplifier U26B and associated components. A *Fwd Pwr Sample* signal is applied to A/D converter U28 for application to the front panel's diagnostic display. The *Fwd Pwr* input is also applied to the *Ext Fwd Pwr Sample* output (J1-3), then applied to the remote interface PWB for external monitoring. The buffered *Fwd Pwr* signal is low-pass filtered through operational amplifier U32B and associated components and applied to the *Ext Audio* output (J1-7), then applied to the remote interface PWB for external monitoring. The *Ext Mod % Sample* and *Audio (Speaker)* outputs are not used in J1000 transmitters.

2.6.2.3.6 Low Voltage Power Supplies

Attenuated, buffered samples of all low voltage dc power supplies (+24 V, ± 15 V and ± 5 V) are applied to A/D converters U28 and U29 for application to the front panel's diagnostic display. Lamps DS9 through DS13 indicate the presence of these voltages.

2.6.2.4 Microcontroller

Microcontroller IC U4 interfaces between the diagnostic display and its associated soft-keys. It generates the *Carrier Ref* signal (see paragraph 1.6.2.1), which ultimately determines the forward power level of the transmitter. It also acts as an internal and external serial interface for transmitter alarm and status signals.

2.6.2.5 CPLD

Complex Programmable Logic Device (CPLD) U14 continuously reads digital inputs for all transmitter alarm events. It is programmed to perform root cause detection of a fault as well as high-speed fault protection. Depending on the nature of the fault, the CPLD generates transmitter S*hutback* outputs (J5-1 and J5-2) or various digital control/inhibit signals via a parallel data buss.

2.6.3 Remote Interface PWB

The remote interface PWB (A1A2 - see Figures SD-8 through SD-10) performs the following functions:

- Buffers all external transmitter remote control inputs and transmitter remote status/alarm outputs.
- Provides buffered, analog sample voltages proportional to the B+ supply voltage, total dc current, audio, forward power, and reflected power for external monitoring.
- Conditions the audio (analog or DAB) input's gain and provides filtering and modulation protection.
- Provides monitoring samples of the transmitter's RF output (both analog and DAB). The magnitude of the analog sample is automatically adjusted to ensure a relatively constant voltage, nominally 1V RMS, regardless of RF output level.
- Provides the connection for the system's external interlock circuit between TB2-15 and TB2-16.

2.6.3.1 Remote Inputs

RFI filtering is provided on all control input lines to ensure transmitter operation is not interrupted due to RF pick-up on control lines. Opto-couplers are provided to buffer/isolate the external circuits and prevent any unwanted transients from affecting transmitter operation. The position of shorting jumpers E8 through E22 and E27 allow the control inputs to be configured to operate from a single-ended or differential input. Refer to section 2 of *the Installation and Operation* manual for detailed description on single-ended versus differential inputs.

2.6.3.2 Remote Outputs

Remote alarm/status outputs are provided on terminals of the remote interface PWB. A darlington transistor for each alarm/status output provides a negative logic (current-sink-to-ground) output when a logic 'true' (alarm condition or active status) exists. The switching circuit provides an open collector during logic 'false' conditions (non-alarm or non-active status condition) and has no influence on the external monitoring circuit. Each monitoring circuit must present impedance between the switching device and a positive dc voltage source that will result in a current flow of not more than 50 mA. +24 V is available for use by the remote monitoring circuits on TB4-18.

2.6.3.3 Audio Input

The transmitter's audio input is applied to the **AUDIO INPUT** terminals (TB2-12/13/14), for analog audio, or to RJ45 connectors J2 [**MAG (HD-R)**] and J3 [**PHASE (HD-R)**], for HD-R operation. The audio signal is then applied to the balance/unbalance circuit. The position of shorting jumpers E1 and E2 determine the amplitude modulating source – **HD-R** or normal **AUDIO** program.

2.6.3.4 Balance/Unbalance Circuit

The balance/unbalance circuit, which converts the balanced audio input or HD-R magnitude input to an unbalanced signal, consists of U2A or U5A and its associated components. The output of differential amplifier U2A or U5A is an unbalanced audio that is a positive voltage for positive half cycles and a negative voltage for negative half cycles. Any unwanted noise transients that are induced on the audio input will be in-phase and of equal amplitude. Since the transients are in-phase and of equal amplitude, they have no influence on U2A's or U5A's output and they will not appear at U2A's or U5A's output.

2.6.3.5 Zero Crossing Detectors

The audio zero crossing detector consists of U11B, Q1, CR1, and associated components. The HD-R zero crossing detector consists of U9A, Q6, CR38, and associated components. These circuits are the +15 V charge voltage sources for C32 during the negative audio half-cycles. During positive audio half-cycles they are effectively open circuit and have no influence on the charge state of C32. A small dc bias (0.3 V) is present on U11B's non-inverting input or U9A's inverting input for HD-R and DRM operation.

2.6.3.6 Modulation Level Detector

The modulation level detector circuit monitors the on/off times of the *Fwd Pwr Sample* output for excessive on times. It automatically inhibits a portion of any modulating audio's positive going half-cycle that would cause excessive 'on times' and result in the stress current threshold of the transmitter's RF power amplifier stages being exceeded. The circuit consists of comparators U11C, U11D, U12A, U12B, U12C, U12D and their associated components. It provides a discharge path to -15 V for C32 when the 'on time' of the *Fwd Pwr Sample* signal will result in modulation peaks that exceed safe operating levels

2.6.3.6.1 The *Fwd Pwr Sample* input, applied to the inverting inputs of each comparator, is a varying positive dc voltage directly proportional to the RF output's modulation envelope. The audio component is synchronized with the audio output of U11B and is the most positive at the peak of the modulating audio's positive half-cycle.

2.6.3.6.2 Each comparator has a reference voltage applied to its non-inverting input that represents the RF stress current threshold for a specific carrier level/audio amplitude/audio frequency combination (see Table 2-1). **SET THRESHOLD** potentiometer R45 is adjusted to precisely set the threshold voltages, when the PWB is installed in a transmitter.

2.6.3.6.3 When the voltage representing the modulation envelope exceeds the RF stress current threshold of a comparator, that comparator connects its output resistor to -15 V and provides a discharge path for C32. The time for C32 to discharge to a negative voltage is dictated by the number of resistors connected to -15 V (modulation amplitude) and the period of time they are connected (audio frequency). C32's discharge time (dictated by the R/C time constant) is progressively faster as the modulation depth increases (more comparator thresholds are exceeded) and it has a longer time to discharge as the audio frequency decreases. Refer to Table 2-1 for the duration of a positive half-cycle at the lowest unaffected audio frequency for specific modulation depths.

Table 2-1: Peak Modulation Limit Threshold

Mod Depth Peak)	Lowest Unaffected Freq.(Hz)	Duration (ms)
85%	10	50.0
95%	11	46.6
105%	20	25.6
115%	32	15.4
125%	56	8.9
135%	96	5.2

2.6.3.7 Audio Chopper

The audio chopper circuit consists of U11A, Q2, Q7, and their associated components. It inhibits some portion of positive audio half-cycles that cause modulation peaks/ durations that exceed the RF stress current threshold of the transmitter's RF power amplifiers. It accomplishes this by clamping the modulating audio to ground whenever the charge voltage on C32 switches from a positive value to a negative value and retains this state until C32's charge voltage returns to a positive value at the end of the positive audio half-cycle.

When C32 has a positive voltage charge, U11A's non-inverting input is more positive than its inverting input. U11A's output is an open collector. Q2 and Q7 are reverse biased and have no influence on the modulating audio or HD-R. Q4 is also reverse biased. The *mod prot/audio limit* output (J1-31) is open collector (logic negative state). When the modulation level detector circuit provides C32 a discharge path to -15 V (because one or more RF stress current thresholds have been exceeded) for a long enough period of time to achieve a negative voltage charge, U11A's non-inverting input will go less positive than its inverting input. U11A's output is a current-sink-to -15V and causes Q2, Q7 and Q4 to be forward biased (turned on). The modulating audio or HD-R magnitude signal is clamped to ground by Q2 or Q7 until the start of the next negative audio half-cycle (for the balance of the current positive audio half-cycle), when the zero crossing detector circuit provides a low impedance source to +15 V and charges C32 to a positive value. The *Mod Prot/Audio Limit* output is a current-sink-to-ground (logic true state) for each offending positive audio half-cycle. The system diagram's **Exciter** lamp will flash on and off when this circuit is active.

2.6.3.8 Audio Gain

U9B is connected as a unity gain, buffer amplifier. **AUDIO GAIN** potentiometer R23 is adjusted for the desired modulation depth when the interphase PDM driver PWB is installed in its host transmitter. It has sufficient range to set the modulation depth at 100% when the audio input is between 0 dBm and +12 dBm.

2.6.3.9 Audio Filter

The audio filter circuit is a low pass filter with a -1.0 dB, high frequency roll-off at one of four user-selected frequencies. The **AUDIO FILTER** switch S1 has settings to select one of four roll-off frequencies (16 kHz, 13.5 kHz, 10.5 kHz or 7.5 kHz). The high frequency roll-off selection is normally dictated by complex factors, such as an antenna with sideband limitations, square wave overshoot, or the equipment that pre-processes the audio. The **AUDIO FILTER** switch and audio filter are bypassed (using shorting jumpers E3 and E4) when digital program input is used.

2.6.3.10 RF Monitor Level

The *RF Monitor In* input (J13) is applied to a group of series resistors, each in parallel with contacts of a relay switching circuit. The *serial data out (2)* signal, applied to the *A* input (pin 14) of 8-bit shift register U39, and represents the carrier reference level, hence the transmitter's RF output. U39's parallel *Q* outputs energize the appropriate relay(s) to provide 1.0 V RMS into a 1,000 Ω or 50 Ω load as the *RF Monitor Out* output (J14), when the RF output is between 100 W and 1,100 W.

2.6.3.11 Magnitude Gain

MAG GAIN potentiometer R36 is adjusted for the correct magnitude signal when connected to an NE IBOC exciter for HD-R operation.

J1000
REPAIR MANUAL

Section 3 COMPONENT LEVEL TROUBLESHOOTING

3.1 INTRODUCTION

The information provided in this section is intended to assist an experienced electronic technician in fault diagnosis and isolation of a problem to the component level. It is assumed that system level troubleshooting as outlined in the *Installation and Operation* manual has been performed and the problem has been isolated to a particular PWB or assembly.

3.2 ELECTROSTATIC DISCHARGE PROTECTION

The transmitter's PWBs/assemblies contain semiconductor devices that are susceptible to damage from electrostatic discharge (ESD). The following precautions should be taken when handling an assembly that contains these devices:

NOTE

Electrostatic energy is produced when two insulating materials are rubbed together. A person wearing rubber-soled shoes, walking across a nylon carpet or a waxed floor can generate an extremely large electrostatic charge. This effect is magnified during periods of low humidity. This high voltage may damage semiconductor devices such as integrated circuits, field-effect transistors, thyristors and Schottky diodes unless adequate precautions are taken.

3.2.1 Discharging of Personnel

Personnel must be electrically discharged by a suitable ground system (anti-static mats, grounding straps) when removing an assembly from the transmitter and while handling the assembly for maintenance procedures.

3.2.2 Handling/Storage

The assembly should be placed in an anti-static bag when it is not installed in a host transmitter or when it is not being subjected to maintenance procedures. Electronic components should be stored in anti-static materials.

3.2.3 Tools/Test Equipment

Testing and maintenance equipment, including soldering and unsoldering tools, should be suitable for contact with static sensitive semiconductor devices. A 40 W, temperature controlled soldering iron is recommended.

3.2.4 Stress Current Protection

Precautions should be taken to ensure the static sensitive semiconductor devices are protected from unnecessary stress current. This is achieved by ensuring:

- Current is not flowing when an electrical connection is broken.
- Voltages are not present on external control/monitoring circuits when they are connected.

3.3 COMPONENT REPLACEMENT PRECAUTIONS

When replacing a part on a PWB or assembly, the following precautions must be taken:

- Ensure all PWBs are at least two-sided and contain through-hole plating. Use of excessive heat or excessive mechanical force can damage the PWB. Multi-layer PWBs are more susceptible to damage than two-sided PWBs.

- DO NOT replace components while the PWB/assembly is mounted in the transmitter.

- When removing a defective component, cut the body from the legs before unsoldering the component. This will reduce the heat stress to the PWB's traces.

- Use a solder removal tool or solder wick whenever possible to remove the solder from the component's legs before removing the device.

- Pre-form the legs of a replacement component to fit the PWB hole spacing. This also applies to ICs that mount in sockets.

- For mechanically fastened components, such as power MOSFETs, secure the mechanical connection before soldering the legs to reduce the stress on the solder connection.

3.4 SURFACE MOUNT TECHNOLOGY

Surface mount technology (SMT) enables more efficient use of board space than with through-hole technology, but component replacement is more difficult. It is not practical to place SMT components in the transmitter spares kit because of their small size. f the repair site is not already equipped to handle surface-mount technology, the following guidelines will aid in component replacement:

3.4.1 Location of Parts

SMT components are predominantly on controller/display PWB A1A1 and remote interface PWB A1A2. The RF synthesizer PWB(s) (A1A4 and, if installed, A1A6) has two SMT integrated circuits. SMT components are 0603 – 6 mm x 3 mm.

3.4.2 Soldering Guidelines

The following guidelines are provided to aid the maintainer when soldering SMT components on a PWB:

(a) Recommended soldering aids:

- needle tip for soldering iron
- SMT solder (low melting point, fine diameter)
- water-soluble, 'no-clean' solder flux pen
- magnifying glass
- steady hand

(b) Ensure pads are sufficiently cleaned, using solder braid.

(c) Apply a thin layer of solder flux on the pads.

(d) For ICs, place the IC on the pads, noting alignment, and gently press it in place. The flux should have enough adhesion to hold the chip in place.

(e) Carefully solder one corner pin, then verify the IC's alignment. Solder the opposite corner pin, then verify alignment again.

(f) If alignment is correct, carefully solder each pin, in order, around the IC.

(g) If a solder bridge occurs, use a very fine solder wick to remove it.

3.5 FET CHECKING/REPLACEMENT

The transmitter contains many FETs and other switching semiconductor devices. The FETs most likely to fail are located on RF power modules A (A2A1) and B (A2A2). In the case of a failure caused in the RF power module, it is recommended the following devices be checked and, if necessary, replaced:

- power MOSFET Q1 (Nautel Part # QAP49) of modulator A3
- power MOSFETs Q1 through Q4 (Nautel Part # QAP49) of power amplifier A5
- FETs Q1 and Q2 (Nautel Part # QR54) of forward converter PWB A1.

(a) Unsolder the gate pins of the device under test and all parallel devices. Refer to the assembly's electrical schematic in Section 6 to determine the parallel devices, if applicable. Refer to the assembly's detail drawing in Section 7 to verify device pin-out.

NOTE

A MOSFET under test must be turned on by applying a dc voltage between its gate and source terminals. Some digital multimeters have sufficient dc voltage on their test leads when set to 'diode' or 'resistance' positions. If the digital multimeter being used does not have sufficient voltage (9V battery recommended), an alternate dc voltage source must be obtained.

(b) Turn off the suspect FET and all parallel devices by shorting the gate to source. Using a digital multimeter, momentarily place the negative lead on the gate pin and positive lead on the source pin for each FET in the circuit.

(c) Measure the drain-source resistance with positive lead on the drain and the negative lead on the source. Digital multimeter reading will indicate an open circuit.

(d) Measure the drain-source resistance with the negative lead on the drain and the positive lead on the source. Digital multimeter reading will indicate a diode pedestal.

(e) If the requirements of steps (c) and (d) are not met, replace the device as detailed in steps (i) through (m).

(f) Turn on the device under test by placing the positive lead on the gate and the negative lead on the source.

(g) Measure the drain-source resistance with the positive lead on the drain and the negative lead on the source. Digital multimeter reading will indicate a short circuit.

(h) If the requirement of step (g) is met, the FET is operational. Turn it off and verify as detailed in steps (b) and (c), and then proceed to the next suspect device. If the requirement of step (g) is not met, replace the device as detailed in steps (i) through (m).

(i) Unsolder the drain and source pins of the defective device.

(j) Remove the hardware securing the device in place and remove the defective device. Ensure the associated heat sink surface on the input PWB is cleaned.

NOTE

FETs are static sensitive. Ensure replacement devices are handled in a manner that protects the FETs from static..

(k) Apply a thin, even coat of thermal compound on the bottom of the new device.

(l) Reinstall the device on its associated, cleaned heat sink using the hardware removed in step (j). The Belleville (cupped) washer must be replaced with a new washer (Nautel Part # HZ48, located in ancillary kit). Both sides of the insulator (if replaced) should have a thin, even coat of thermal compound applied. Refer to the assembly's detail drawing in Section 7 to verify the hardware orientation for the device being replaced.

(m) Using a torque screwdriver, tighten mounting hardware to the value (typically 3 to 4 inch-pounds) specified on the assembly's detail drawing in Section 7, ensuring that the pins of the device are aligned with their corresponding solder terminals. Solder the pins to their associated terminals.

3.6 TROUBLESHOOTING REFERENCE DATA

Typical waveforms are provided for critical signals to assist in isolating a fault to a particular component or circuit. This data can only be verified when the referenced assembly is still installed in the transmitter. Electrical schematics for all PWBs and assemblies are provided in Section 6 of this manual.

WARNING

Nautel does not recommend troubleshooting the RF power module's forward converter PWB (A2A1A1 or A2A2A1) while the transmitter is turned on. Voltages that are hazardous to life are present near the step-up transformer (T4) on the PWB.

NOTE

The data provided in this section is intended to represent the nominal level only. Component tolerances and carrier frequency may cause slight differences in the measured and presented data. For voltage levels dependent on the level of another parameter, that parameter's level has been noted next to the test voltage.

All measurements/waveforms have been recorded with the transmitter output power set to 1,000 W, unless otherwise specified.

Test point references are included with each waveform's title.

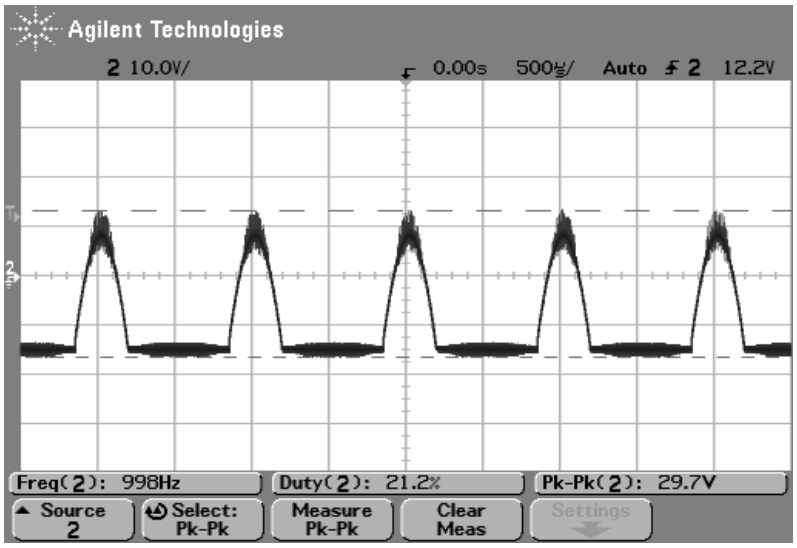


Figure 3-1 Dump Input to Modulator
(Measured at TP3 of power module interface PWB A2A1A2 or A2A2A2)

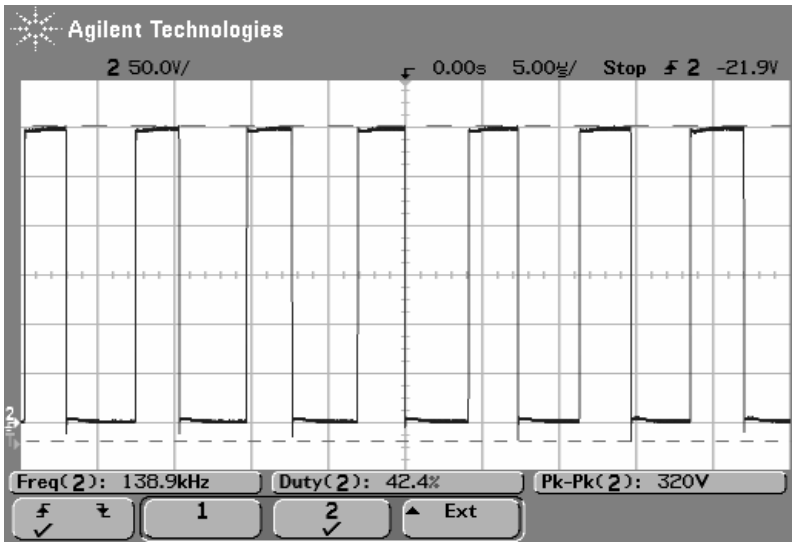


Figure 3-2 PDM (B+) Output of Modulator
(Measured at E1 of modulator A2A1A3 or A2A2A3 or at 'B' terminal of modulator filter PWB A2A1A4 or A2A2A4)

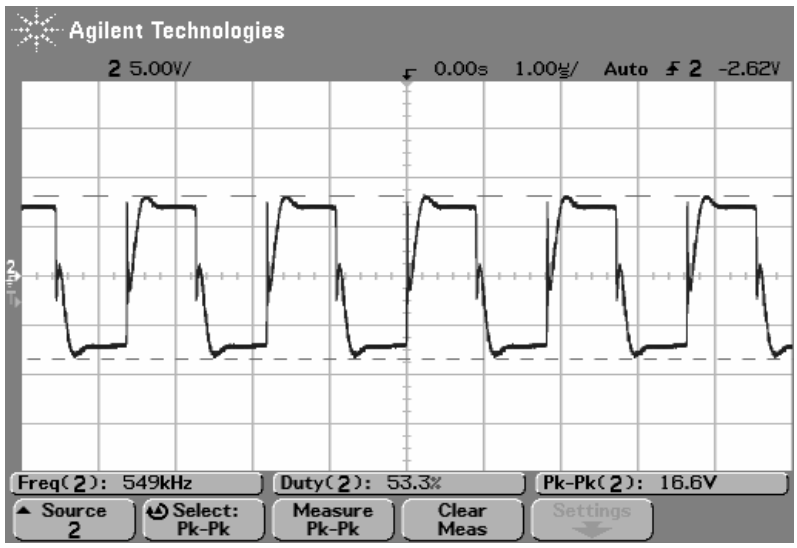


Figure 3-3 RF Drive Input to Power Amplifier
(Measured at CR5-Anode of power amplifier A2A1A5 or A2A2A5)

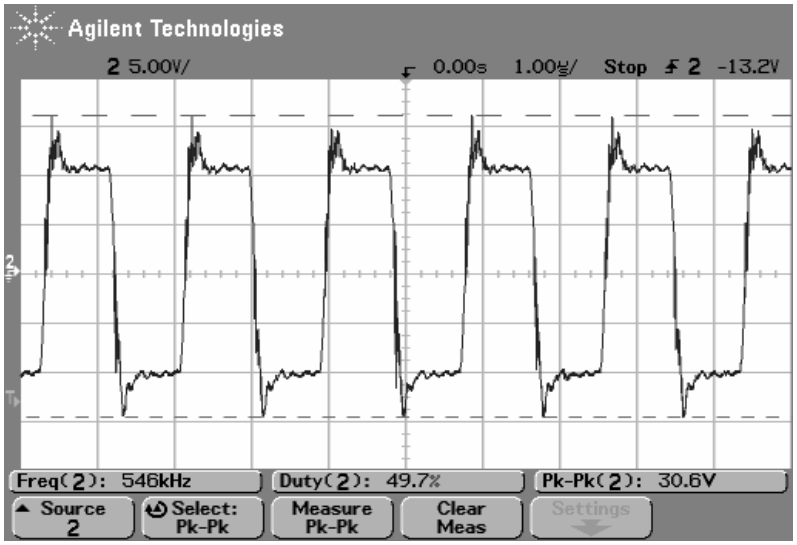


Figure 3-4 Power Amplifier FET Gate Input
(Measured at gate of Q1 through Q4 of power amplifier A2A1A5 or A2A2A5)

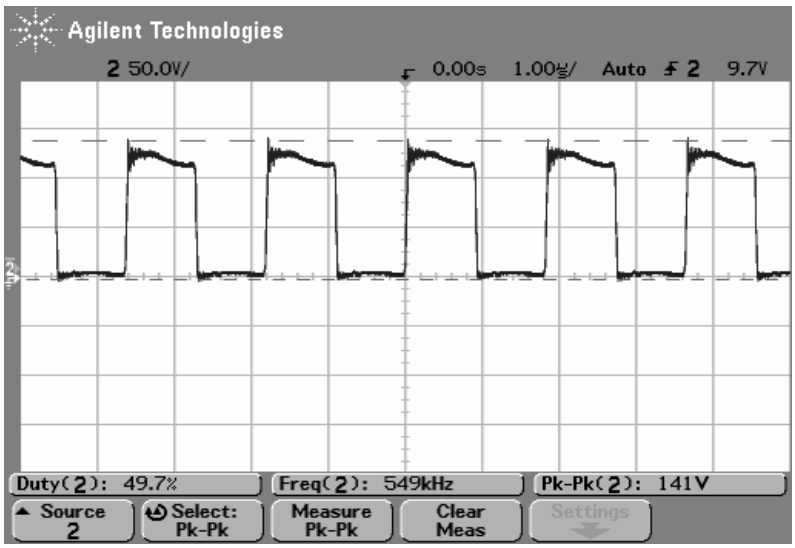


Figure 3-5 RF Output of Power Amplifier
(Measured at E2 or E3 of power amplifier A2A1A5 or A2A2A5)

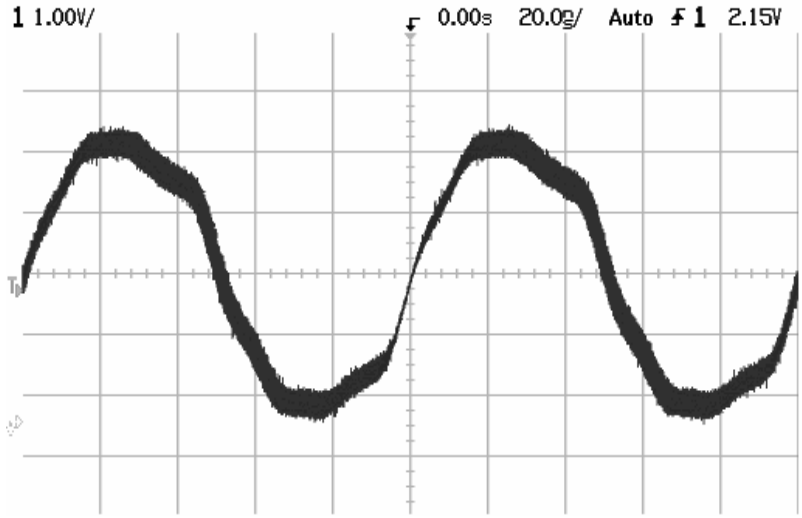


Figure 3-6 Internal 10 MHz Reference Signal
(Measured at U1-Out of RF synthesizer PWB A1A4 or A1A6. **REFERENCE (A)** jumper E1 installed in **INT** position)

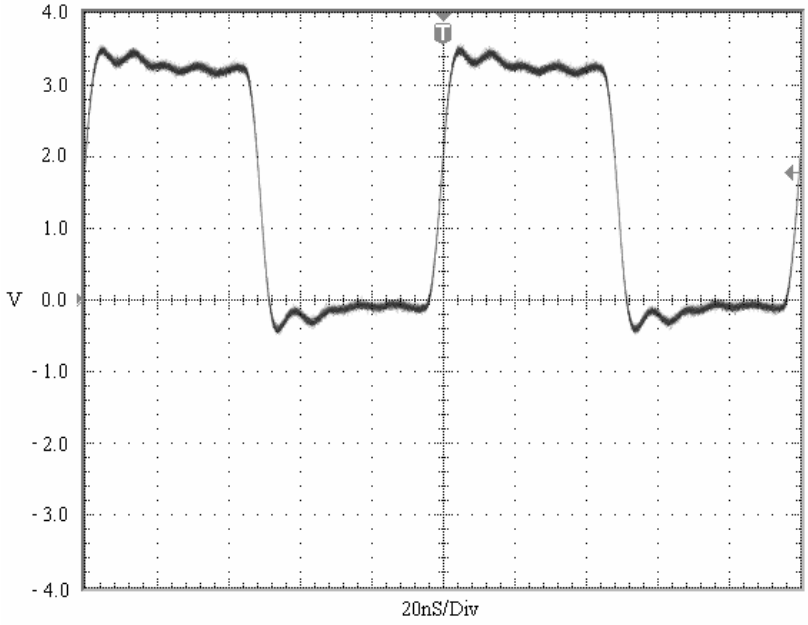


Figure 3-7 10 MHz Reference Signal for RF Synthesizer PWB
(Measured at TP1 of RF synthesizer PWB A1A4 or A1A6)

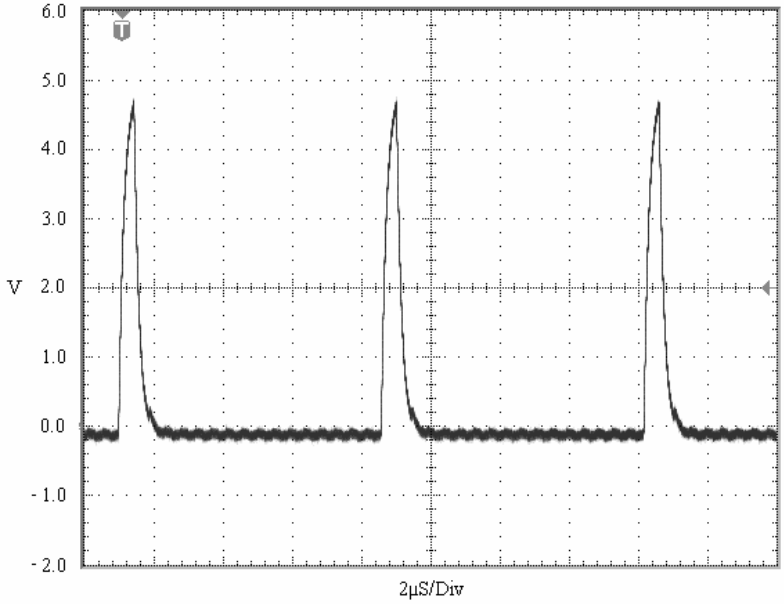


Figure 3-8 2ƒPDM Generator
(Measured at TP2 of RF synthesizer PWB A1A4 or A1A6)

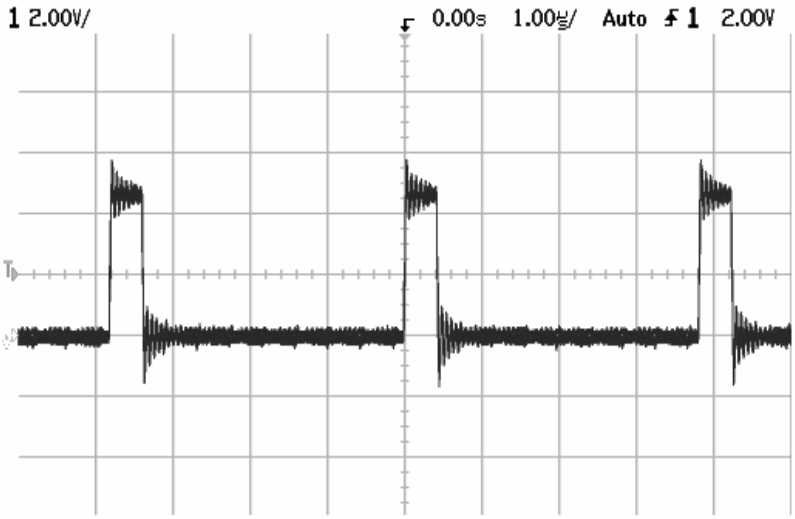


Figure 3-9 2ƒPDM Output of RF Synthesizer
(Measured at J1-25 or U8-12 of RF synthesizer PWB A1A4 or A1A6)

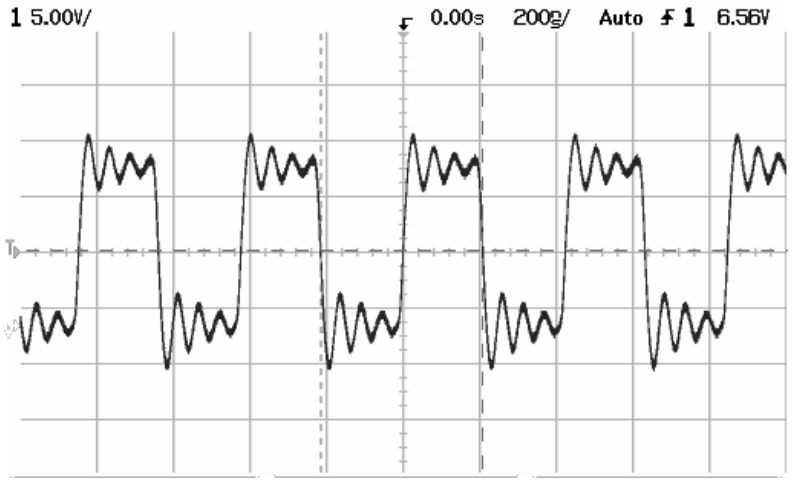


Figure 3-10 4fc/B Signal
(Measured at U10-4 of RF synthesizer PWB A1A4 or A1A6)

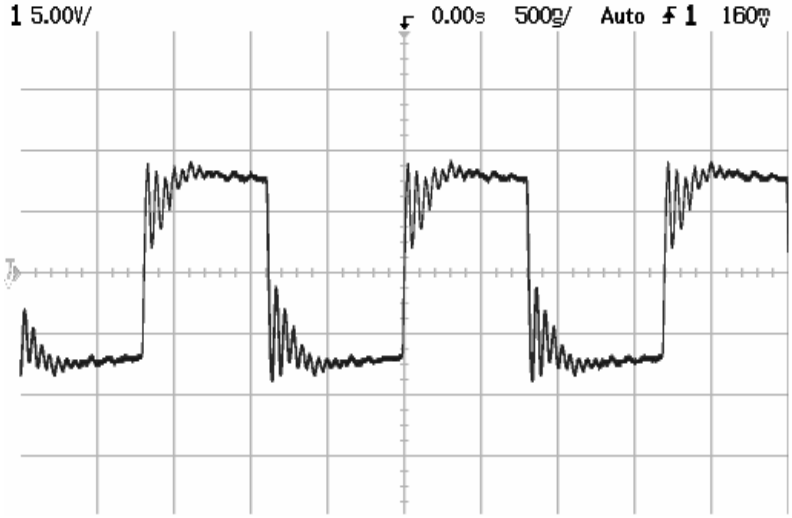


Figure 3-11 4fc ÷ 4 Circuit Output
(Measured at U12-1 of RF synthesizer PWB A1A4 or A1A6)

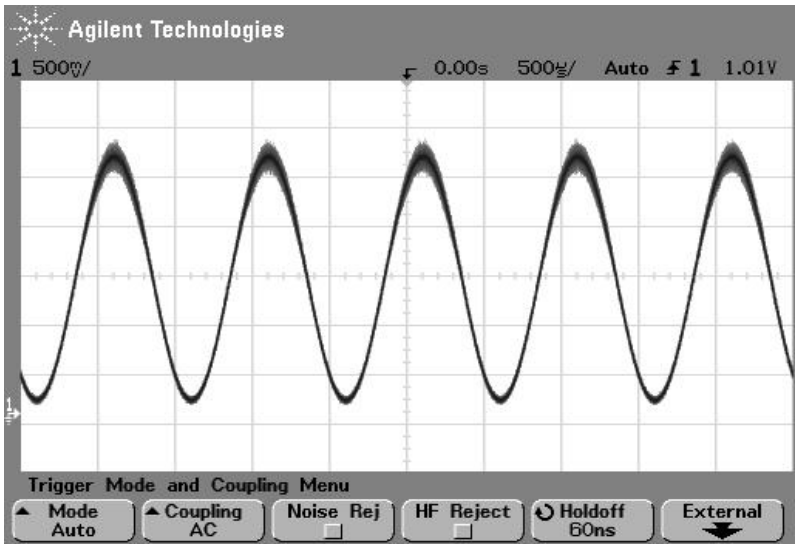


Figure 3-12 Unbalanced Audio
(Measured at U9-8 of remote interface PWB A1A2)

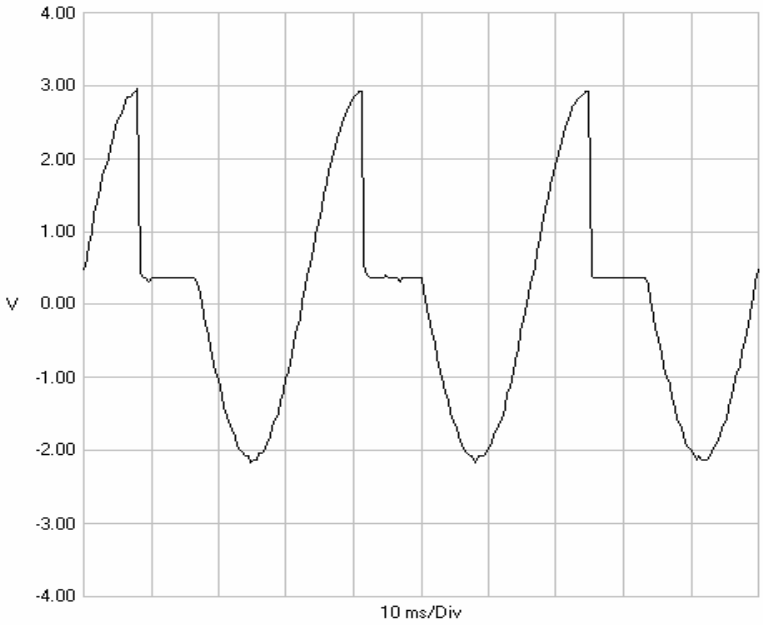


Figure 3-13 Audio Chopper
(Measured at TP7 of remote interface PWB A1A2)

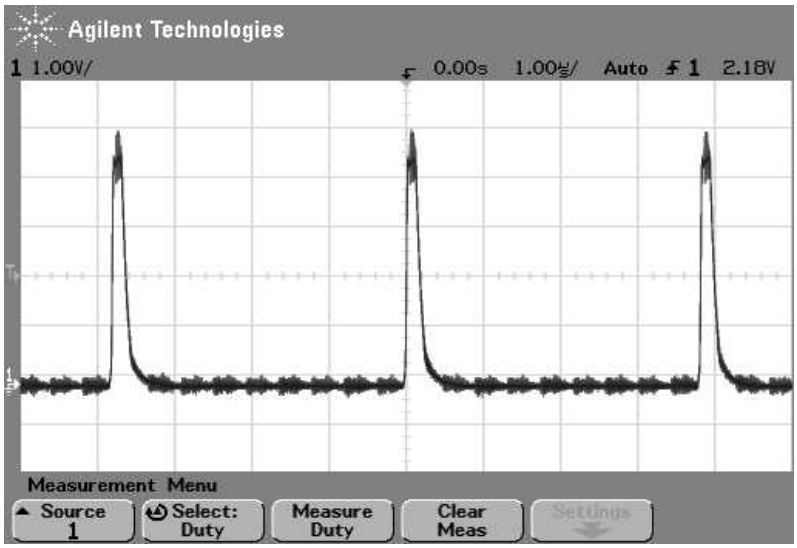


Figure 3-14 2ƒPDM Input to Interphase PDM Driver PWB
(Measured at J1-7 or U1-3 of interphase PDM driver PWB A1A5 or A1A7)

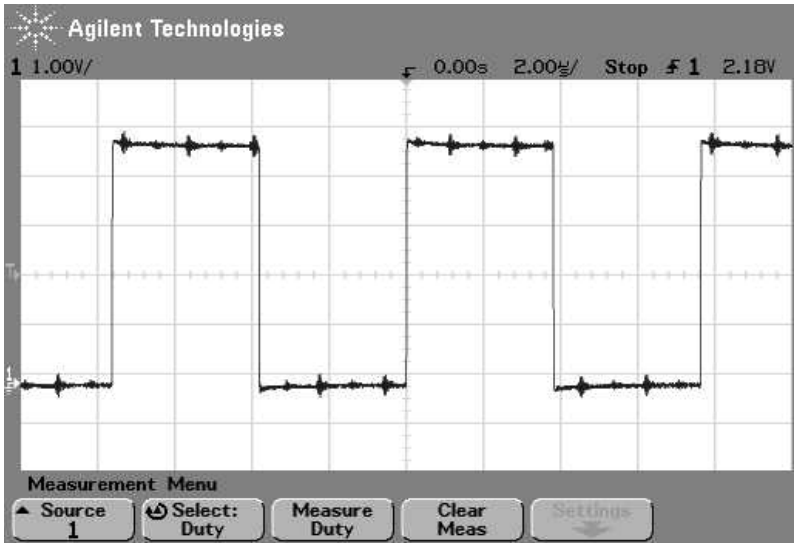


Figure 3-15 ƒPDM – Linear Integrator Input
(Measured at TP2 of interphase PDM driver PWB A1A5 or A1A7)

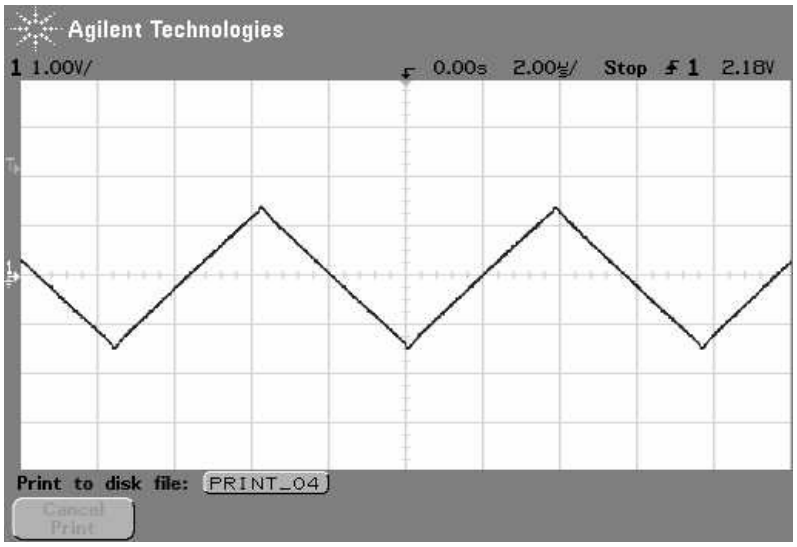


Figure 3-16 Linear Integrator (Ramp) Output
(Measured at TP7 of interphase PDM driver PWB A1A5 or A1A7)

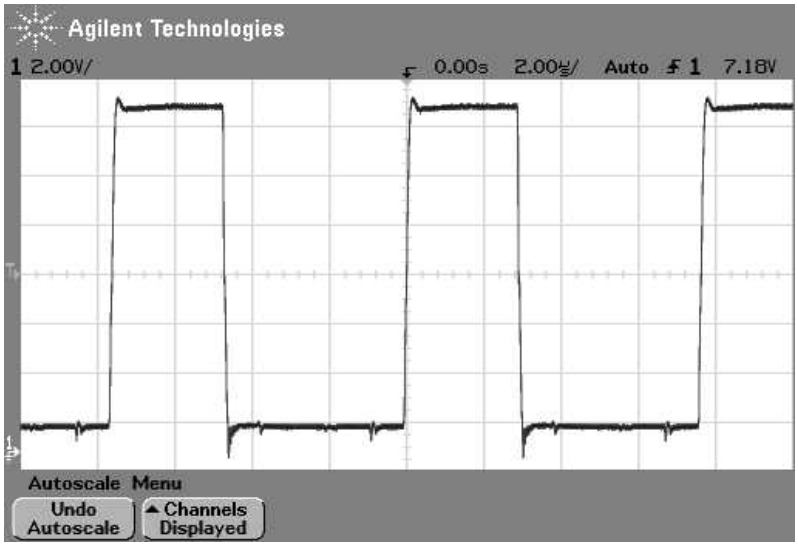


Figure 3-17 Interphase PDM Generator (PDM1) Output
(Measured at TP17 of interphase PDM driver PWB A1A5 or A1A7)

J1000
REPAIR MANUAL

Section 4 PARTS INFORMATION

4.1 INTRODUCTION

This section contains reference designation lists that provide descriptive and provisioning information for all electrical and mechanical parts that have an assigned reference designation and form a part of the subject equipment.

4.2 FAMILY TREE

Figure 4-1 depicts the family tree for the subject equipment. It is based on the descending order of the reference designation hierarchy and identifies all assemblies that have an assigned Nautel configuration control number.

4.3 HOW TO LOCATE INFORMATION FOR A SPECIFIC PART

To locate the information for a specific part, the assigned reference designation for the part must be known. In addition, the Nautel configuration control number (e.g., NAP31/02) assigned to the assembly containing the part or the full reference designation, including the reference designation of all higher assemblies, must be known.

4.3.1 When Nautel Configuration Control Number Is Known:

When the Nautel configuration control number is known, the information for a part can be located as follows:

- Refer to the family tree (Figure 4-1) and identify the block(s) associated with the Nautel configuration control number. At the bottom of each family tree block, a reference is made to SEE PART NUMBER INDEX TABLE. Locate the part's reference designation in the identified reference designation list in this section, noting they are sorted alphanumerically.

4.3.2 When Ref Des Is Known:

When the full reference designation is known, the information for a part can be located as follows:

- Refer to the family tree depicted in Figure 4-1 with the full reference designation.
- Follow the family tree branches to the block that represents the lowest level assembly assigned a Nautel configuration control number. Then locate the part number index table for that Nautel configuration control number.
- Locate the part's reference designation in the specified table.

4.4 REFERENCE DESIGNATION LISTS

Individual reference designation lists are provided for:

- assemblies that are assigned an alpha-prefixed Nautel nomenclature (e.g., NAPC143A/01)
- cable harnesses that are assigned a numbered Nautel part (e.g., 197-8060)
- optional kits that are assigned a numbered Nautel part (e.g., 197-3005)

To obtain the full reference designation for a specific part the Nautel configuration control number must be located in the family tree (Figure 4-1) to include the reference designation of all higher level assemblies. The reference designation lists, which are titled and presented in alphanumeric order, are divided into columns to aid in locating specific information.

4.5 COLUMN CONTENT

The following paragraphs provide an explanation of the purpose and contents of each column in the part number indexes.

4.5.1 Ref Des Column

The 'ref des' column contains the reference designation for a specific part. These designations are assigned in accordance with the requirements of American National Standard Specification ANSI Y32.16.

4.5.2 Description Column

This column contains the name and descriptive information for each part. The key word is presented first, followed by the adjective identifiers. When the description is 'See Family Tree for Assembly Nomenclature', the associated part is subject to its own part index table or is contained in an optional kit's list. Look up the reference designation list title (nomenclature) and the reference designation of the associated part in the family tree (Figure 4-1) to determine where to locate its part information.

4.5.3 Nautel # Column

This column contains the Nautel number assigned to each part. This number is Nautel's drawing number for Nautel manufactured parts, Nautel's configuration control number for assemblies that are under configuration control management, or Nautel's inventory management number for purchased parts. When a Nautel configuration control number (e.g. NAPD*) is referenced in this column, the associated ref des item is subject to its own part index table.

4.5.4 Vendor # Column

This column contains an original equipment manufacturer's part number for a part. A single part number is listed for each part, even though there may be more than one known manufacturer. The listed number is Nautel's usual or preferred choice. The use of this number does not restrict Nautel from selecting and using commercial equivalents during manufacture, where their use will not degrade circuit operation or reliability.

4.5.5 OEM Code Column

This column typically contains a five digit coded group as the original equipment manufacturer's (OEM) identifier. The code was extracted from Cataloging Handbook H4/H8 - Commercial and Government Entity (Cage) Code. Manufacturers that were not listed in the catalog when this listing was compiled have been assigned a unique five-letter code. This code is assigned arbitrarily and has no other significance. The manufacturers identified for parts that have JAN or MIL part numbers are Nautel's normal supply source for that part.

NOTE

OEM code 37338 is listed for parts manufactured by Nautel or to a Nautel control drawing. United States of America customers should refer all replacement part orders to Nautel Maine Incorporated (OEM code 57655).

4.6 OEM CODE TO MANUFACTURER CROSS-REFERENCE

The OEM (CAGE) codes listed in the reference designation lists are representative of the original equipment manufacturers of those parts. To determine a specific part's manufacturer contact information, enter the five-character OEM (CAGE) code for that part in the following website:

https://www.bpn.gov/bincs/begin_search.asp

After entering the OEM (CAGE) code number, manufacturer pertinent information (address, telephone number, fax number, etc.) will be displayed. Please contact Nautel if a part cannot be obtained (see also ON-LINE PART QUOTES in the *Warranty* section of this manual).

4.6.1 Manufacturer's Index

For customers without web access, Table 4-1 provides a cross-reference from the original equipment manufacturer's (OEM) codes to the manufacturer's name. The listing is sorted alphanumerically by the OEM code.

4.7 COMMON ABBREVIATIONS/ ACRONYMS

The following abbreviations/acronyms may appear in the ***Description of Part*** column:

SMT - Denotes item is designed to be installed using Surface Mount Technology.
MTA - Denotes item is a Mass Termination Assembly connector.
SIP - Single In-line Package
DIP - Dual In-line Package
IDC - Denotes item is an Insulation Displacement connector for ribbon cable.

Table 4-1: Manufacturer's Index

0A5K5	IXYS Corporation
0B0A9	Dallas Semiconductor Corporation
0GP12	Radiall Incorporated
0G343	Huffman Manufacturing Company
00779	CTS Company Incorporated
01295	Texas Instruments Incorporated
04713	Motorola Incorporated
06090	Raychem Corporation
07263	Fairchild Camera and Instrument Corp
08779	Signal Transformer Company Inc
09482	Amp of Canada Limited
09581	3M Canada Incorporated
1EM90	Lumex Opto/Components Incorporated
1FN41	Atmel Corporation
1JRT7	Epson Electronics American, Inc
1MQ07	ZRG Incorporated
1W344	United Chemi-Con
12969	Micro USPD Incorporated
13103	Thermalloy Company Incorporated
14655	Cornell Dubilier Electronics
16704	Cramer Coil and Transformer Co. Inc.
17856	Vishay Siliconix
19647	Caddock Electronics Incorporated
22421	Thomas and Betts Limited
23875	M-Tron Industries Incorporated
24355	Analog Devices Inc.
25706	Daburn Electronics & Cable Corporation
27014	National Semiconductor Corp
3C057	Astro Aircom LLC
3DX59	Citizen America Corporation
3N087	Mill-Max Manufacturing Corporation
30521	Optrex Incorporated
31433	Kemet Electronics Corporation
31781	Edac Incorporated
33062	Ferronics Incorporated
34371	Intersil Corporation
35005	Dale Electronics Limited
4G927	RayChem Corporation
45496	Digital Systems
5Y407	Phoenix Contact Incorporated
50434	Hewlett Packard Company
54583	TDK Electronics Corporation
56289	Sprague Electric Company
56845	Vishay Dale Electronics Incorporated
59124	KOA Speer Electronics Incorporated
61529	Airmat Corporation
64155	Linear Technology Corporation
68994	XILINX Incorporated
69669	Hammond Power Solutions Inc
7D893	Fairchild Semiconductor Corporation
73949	Guardian Electric Mfg. Company
75042	TRW Incorporated
75915	Littelfuse Tracor Incorporated
80294	Bourns Instruments Incorporated
81073	Grayhill Incorporated
81483	International Rectifier
83330	Dialight Corporation, DBA Dialight
91833	Keystone Electronics Corporation
91929	Honeywell Incorporated
96095	AVX Ceramics Div of AVX Corporation
97525	Transico Incorporated
CANTH	Cantherm
COILC	Coilcraft
DEARBO	Dearborn Electronics Incorporated
DELTA	Delta Electronics, Incorporated
EPCOS	EPCOS
ER737	Texas Instruments
GENSEM	General Semiconductor
IXYS	IXYS Incorporated
MAGNE	MagneTek Triad
MICREL	Micrel Incorporated
MURATA	Murata
ON SEMI	ON Semiconductors
QT	QT Optoelectronics
RALTRO	Raltron Electronics
SAHA	Saha Mica Capacitors
SBE	SB Electronics Incorporated
SB ELEC	SB Electronics Incorporated
SOSH	Soshin Electric Company, Limited
UC0404	St Microelectronics Limited
TAIKO	TAIKO Electronic

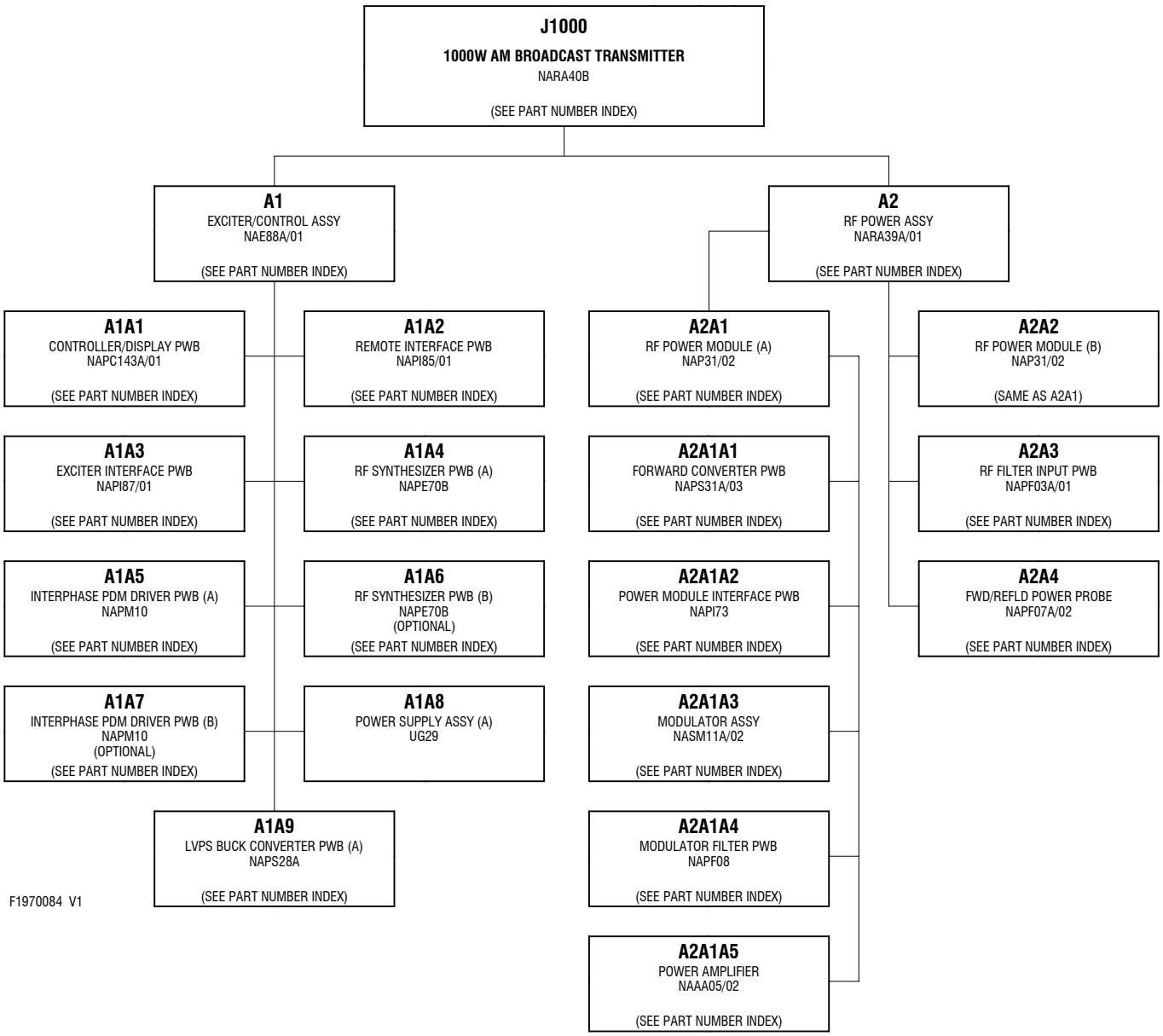


Figure 4-1 Family Tree – J1000 1,000 Watt AM Broadcast Transmitter

197-1015 Ribbon Cable Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
P01	Conn, Recept, Ribbon Cable, 10 pin	JP50	746285-1	00779
P02	Conn, Recept, Ribbon Cable, 10 pin	JP50	746285-1	00779

197-1021 RF Output Transformer Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
P01	Conn, Contact, Socket, 18-14,Mate-N-Lock	JT46	350919-3	00779
P01	Conn, Plug, 3-Pin, Mate-N-Lok	JT50	350766-1	00779

197-5010 Reject Load Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
J01	Conn, Coax, N, Recept, Panel,50ohm	JDP21	UG58A/U	02660
R01	Res,Wirewound,Silicon,200w,150ohms,Brckt	RX47	FST-200-150-NI-QC-BKTS	HUNTINGT
R02	Res,Wirewound,Silicon,200w,150ohms,Brckt	RX47	FST-200-150-NI-QC-BKTS	HUNTINGT
R03	Res,Wirewound,Silicon,200w,150ohms,Brckt	RX47	FST-200-150-NI-QC-BKTS	HUNTINGT

197-8011 Reject Load Cable

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
J01	Conn, Coax, N, Plug, 50ohm, Crimp, RG58	JDP22	82-5375	02660
J02	Conn, Coax, N, Plug, 50ohm, Crimp, RG58	JDP22	82-5375	02660

197-8040 10MHz Cable

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
P34	Conn, Plug, Crimp, Coax, RG188 Type	JT38	TMP-K01X-A1	TAIKO
P35	Conn, Coax, BNC, Plug, 50ohm,Crimp	JDP24	225395-7	09482

197-8040-01 10MHz Cable

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
P36	Conn, Plug, Crimp, Coax, RG188 Type	JT38	TMP-K01X-A1	TAIKO
P37	Conn, Coax, BNC, Plug, 50ohm,Crimp	JDP24	225395-7	09482

197-8060-02 Cable Set

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
P01	Conn, Recept, Ribbon Cable, 40 pin	JP51	746288-9	00779
P02	Conn, Recept, Ribbon Cable, 40 pin	JP51	746288-9	00779
P03	Conn, Recept, Ribbon Cable, 40 pin	JP51	746288-9	00779
P04	Conn, Recept, Ribbon Cable, 40 pin	JP51	746288-9	00779
P05	Conn, Recept, Ribbon Cable, 40 pin	JP51	746288-9	00779
P06	Conn, Recept, Ribbon Cable, 40 pin	JP51	746288-9	00779
P07	Conn, Recept, Ribbon Cable, 40 pin	JP51	746288-9	00779
P08	Conn, Recept, Ribbon Cable, 40 pin	JP51	746288-9	00779
P09	Conn, Recept, Ribbon Cable, 20 pin	JP45	746288-4	00779
P10	Conn, Recept, Ribbon Cable, 20 pin	JP45	746288-4	00779
P11	Conn, Shell, D-Sub, 25 pin, T-Screw	JK16	DBBS-25	71468
P11	Conn, IDC, D-Sub, P, HDE-20, 25-Pos	JT31	745496-3	09482
P12	Conn, Shell, D-Sub, 25 pin, T-Screw	JK16	DBBS-25	71468
P12	Conn, IDC, D-Sub, S, HDE-20, 25-Pos	JT30	745495-3	09482
P13	Conn, Recept, Ribbon Cable, 40 pin	JP51	746288-9	00779
P14	Conn, Recept, Ribbon Cable, 20 pin	JP45	746288-4	00779
P15	Conn, Recept, Ribbon Cable, 20 pin	JP45	746288-4	00779
P16	Conn, Shell, D-Sub, 15-Pos, T-Screw	JT33	DABS-15	71468
P16	Conn, IDC, D-Sub, S, HDE-20,15-Pos	JT62	745493-2	09482
P17	Conn, Shell, D-Sub, 15-Pos, T-Screw	JT33	DABS-15	71468
P17	Conn, IDC, D-Sub, S, HDE-20,15-Pos	JT62	745493-2	09482
P18	Conn, Shell, D-Sub, 15-Pos, T-Screw	JT33	DABS-15	71468
P18	Conn, IDC, D-Sub, S, HDE-20,15-Pos	JT62	745493-2	09482
P19	Conn, Shell, D-Sub, 15-Pos, T-Screw	JT33	DABS-15	71468
P19	Conn, IDC, D-Sub, S, HDE-20,15-Pos	JT62	745493-2	09482
P22	Conn, Coax, BNC, Plug, 50ohm,Clamp	JDP25	69475	02660
P23	Conn, Plug, Crimp, Coax, RG188 Type	JT38	TMP-K01X-A1	TAIKO
P24	Conn, Plug, Crimp, Coax, RG188 Type	JT38	TMP-K01X-A1	TAIKO

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Capacitor, Ceramic, 1.0uF 100V	CAP16	RPE114Z5U105M100V	91929
C02	Capacitor,Polyprop,0.056uF,10%,600V	CP30	716P56396L	SBE
C03	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C04	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C05	Capacitor, Ceramic, 1.0uF 100V	CAP16	RPE114Z5U105M100V	91929
C06	Capacitor, Ceramic, 1.0uF 100V	CAP16	RPE114Z5U105M100V	91929
C07	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
CR01	Diode, Power Rectifier, 4A, Ultra Fast	QM22	MUR460	04713
CR02	Diode, Power Rectifier, 4A, Ultra Fast	QM22	MUR460	04713
CR03	Diode, Power Rectifier, 4A, Ultra Fast	QM22	MUR460	04713
CR04	Diode, Power Rectifier, 4A, Ultra Fast	QM22	MUR460	04713
CR05	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
E01	Connector, Quick-Dis, M,1/4 Tab, PWB	HR26	1287	91833
E02	Connector, Quick-Dis, M,1/4 Tab, PWB	HR26	1287	91833
E03	Connector, Quick-Dis, M,1/4 Tab, PWB	HR26	1287	91833
F01	Fuse, 1A, 250V, Slow, 3AG	FA08	313001	75915
J01	Conn, Header, Ribbon Cbl, 10 pin	JA49	499910-1	00779
Q01	Transistor, FET, N Channel	QAP49	STW14NM50(STATIC)	OG343
Q02	Transistor, FET, N Channel	QAP49	STW14NM50(STATIC)	OG343
Q03	Transistor, FET, N Channel	QAP49	STW14NM50(STATIC)	OG343
Q04	Transistor, FET, N Channel	QAP49	STW14NM50(STATIC)	OG343
Q05	Transistor, NPN, Switch/Amplifier	QA45	2N4401	04713
R01	Resistor, Film, 100 Ohms, 5%2W	RBP07	GS-3, 100 OHMS	75042
R02	Resistor, 2.5 Ohm/15W, TO-126	RAB51	MP915-2.5-1	19647
R03	Resistor, MF, 15.0K Ohms, 1PC1/4W	RAB39	MF1/4DL1502F	59124
R04	Resistor, MF, 8.25K Ohms, 1PC1/4W	RAB36	MF1/4DL8251F	59124
R05	Resistor, Film, 33K Ohms, 5%,2W	RBP22	GS-3, 33K OHMS	75042
R06	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R07	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
T01	RF Drive Transformer Assy	197-1020-01	197-1020-01	37338
U01	IC, Mosfet Driver, T0220-5-12A	UD54	MIC4452CT(STATIC)	MICRELL
XF01	Fuseholder, PWB Mount, Type 3AG	FA31	4245	91833

NAE88A/01 Exciter/Control Assembly

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
A01	Controller/Display PWB Assy	NAPC143A/01	197-2050-02	37338
A02	Remote Interface PWB Assy	NAPI85/01	197-2065-01	37338
A03	Exciter Interface PWB Assy,J1000	NAPI87/01	197-4050-01	37338
A04	RF Synthesizer PWB Assy	NAPE70B	194-3060-04	37338
A05	Interphase PDM Driver	NAPM10A/01	197-3050-02	37338
A06	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
A07	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
A08	Power Supply Univ. Input, 24VOutput 100W	UG29	LPS-100-24	MEAN WEL
A09	LVPS Buck Converter PWB Assy	NAPS28A	197-7025-01	37338
A10	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
A11	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
B01	Fan, Brushless, DC, 12V, 60mm	ZA45	KDE1206PTB3	SUNON
B02	Fan, Brushless, DC, 12V, 60mm	ZA45	KDE1206PTB3	SUNON
J01	Conn,Recept,AC,250V,20A,Quick-Dis	JT80	83030400(RoHS)	INTERPO
P25	MTA, Standard Dust Cover, 8 pin	JU07	640551-8	09482
P25	MTA, Keyed Closed End Housing,8 pin,22AWG	JU28	644463-8	00779
P26	MTA, Standard Dust Cover, 4 pin	JU02	640551-4	09482
P26	MTA, Keyed Closed End Housing,4 pin,22AWG	JU27	644463-4	00779
P27	See Options	<	SEE OPTIONS	37338
P28	See Options	<	SEE OPTIONS	37338
P29	MTA, Keyed Closed End Housing,5 pin, 18 AWG	JU39	644461-5	09482
P29	MTA, Standard Dust Cover,5-pin	JU40	640551-5	00779
P30	MTA, Keyed Closed End Housing,5 pin, 18 AWG	JU39	644461-5	09482
P30	MTA, Standard Dust Cover,5-pin	JU40	640551-5	00779
P31	See Options	<	SEE OPTIONS	37338
P32	See Options	<	SEE OPTIONS	37338

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
A01	SMPS, Fwd Conv (JAZZ) PWBAssy	NAPS31A/03	197-7022-07	37338
A02	Power Module Interface PWBAssy	NAPI73	197-1095	37338
A03	Modulator (Jazz) Assy	NASM11A/02	195-1077-03	37338
A04	Modulator Filter PWB Assy	NAPF08	197-1098	37338
A05	Power Amplifier	NAAA05/02	197-1055-02	37338
B01	Fan,Brushless,DC,24V,Fan Fail,115CFM	ZA48	FFB1224HH-R00	DELTA
P02	Conn, Contact, Socket, 18-14,Mate-N-Lock	JT46	350919-3	00779
P02	Conn, Plug, 3-Pin, Mate-N-Lok	JT50	350766-1	00779
P03	Conn, Contact, Socket, 18-14,Mate-N-Lock	JT46	350919-3	00779
P03	Conn, Plug, 3-Pin, Mate-N-Lok	JT50	350766-1	00779
T01	RF Output Transformer Assy	197-1021	197-1021	37338
W01	Ribbon Cable Assy	197-1015	197-1015	37338
W02	Ribbon Cable Assy	197-1015	197-1015	37338

NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
BT1	Battery, Lithium, 3V,20mm Coin Cell	BBLT01	CR2032	PANAS
C001	Cap,SMT,Tantalum,1uF,10%,35V,1411	CTFS02	T494B105K035AS	31433
C002	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C003	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C004	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C005	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C006	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C007	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C008	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C009	Cap,SMT,Tantalum,1uF,10%,35V,1411	CTFS02	T494B105K035AS	31433
C010	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C011	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C012	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C013	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C014	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C015	Cap,SMT,Ceramic,18pF,2%,50V,C0G,0603	CCFS23	C0603C180G5GAC	31433
C016	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C017	Cap,SMT,Ceramic,18pF,2%,50V,C0G,0603	CCFS23	C0603C180G5GAC	31433
C018	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C019	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C020	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C021	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C022	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C023	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C024	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C025	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C026	Cap,SMT,Ceramic,0.47uF,10%,25V,X7R,0805	CCFS09	C0805C474K3RAC	31433
C027	Cap,SMT,Ceramic,0.47uF,10%,25V,X7R,0805	CCFS09	C0805C474K3RAC	31433
C028	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C029	Cap,SMT,Ceramic,0.47uF,10%,25V,X7R,0805	CCFS09	C0805C474K3RAC	31433
C030	Cap,SMT,Ceramic,0.47uF,10%,25V,X7R,0805	CCFS09	C0805C474K3RAC	31433
C031	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C032	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C033	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C034	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C035	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C036	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C037	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C038	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433

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REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C039	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C040	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C041	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C042	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C043	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C044	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C045	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C046	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C047	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C048	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C049	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C050	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C051	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C052	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C053	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C054	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C055	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C056	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C057	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C058	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C059	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C060	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C061	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C062	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C063	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C064	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C065	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C066	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C067	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C068	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C069	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C070	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C071	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C072	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C073	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C074	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C075	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C076	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C077	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433

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REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C078	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C079	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C080	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C081	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C082	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C083	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C084	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C085	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C086	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C087	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C088	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C089	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C090	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C091	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C092	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C093	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C094	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C095	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C096	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C097	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C098	Not Used	-	NOT USED	37338
C099	Not Used	-	NOT USED	37338
C100	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C101	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C102	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C103	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C104	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C105	Not Used	-	NOT USED	37338
C106	Not Used	-	NOT USED	37338
C107	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C108	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C109	Not Used	-	NOT USED	37338
C110	Not Used	-	NOT USED	37338
C111	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C112	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C113	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C114	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C115	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C116	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433

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REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C117	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C118	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C119	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C120	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C121	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C122	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C123	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C124	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C125	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C126	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C127	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C128	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C129	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C130	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C131	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C132	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C133	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C134	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C135	Cap,SMT,Tantalum,1uF,10%,35V,1411	CTFS02	T494B105K035AS	31433
C136	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C137	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C138	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C139	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C140	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C141	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C142	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C143	Not Used	-	NOT USED	37338
C144	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C145	Not Used	-	NOT USED	37338
C146	Not Used	-	NOT USED	37338
C147	Not Used	-	NOT USED	37338
C148	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C149	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C150	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C151	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C152	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C153	Not Used	-	NOT USED	37338
C154	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C155	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433

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REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C156	Not Used	-	NOT USED	37338
C157	Not Used	-	NOT USED	37338
C158	Not Used	-	NOT USED	37338
C159	Not Used	-	NOT USED	37338
C160	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C161	Not Used	-	NOT USED	37338
C162	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C163	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C164	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C165	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C166	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C167	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C168	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C169	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C170	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C171	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C172	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C173	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C174	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C175	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C176	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C177	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C178	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C179	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C180	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C181	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C182	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C183	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C184	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C185	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C186	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C187	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C188	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C189	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C190	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C191	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C192	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C193	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C194	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433

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NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C195	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
CR01	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR02	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR03	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR04	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR05	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR06	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR07	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR08	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR09	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR10	Diode, Zener, 39V, 1.5W, 2%	QK03	1N5939C	04713
CR11	Diode, Zener, 39V, 1.5W, 2%	QK03	1N5939C	04713
CR12	Diode, Zener, 39V, 1.5W, 2%	QK03	1N5939C	04713
CR13	Diode, Zener, 39V, 1.5W, 2%	QK03	1N5939C	04713
CR14	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR15	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR16	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR17	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
CR18	Diode,SMT,Schottky,30V,0.2A,SOD-323	QDSS01	BAT54HT1(STATIC)	04713
DS01	Not Used	-	NOT USED	37338
DS02	Not Used	-	NOT USED	37338
DS03	Not Used	-	NOT USED	37338
DS04	Not Used	-	NOT USED	37338
DS05	Not Used	-	NOT USED	37338
DS06	Not Used	-	NOT USED	37338
DS07	Not Used	-	NOT USED	37338
DS08	Not Used	-	NOT USED	37338
DS09	Diode, SMT, LED, Green, 0603	QDLS01	597-5312-402(STATIC)	83330
DS10	Diode, SMT, LED, Green, 0603	QDLS01	597-5312-402(STATIC)	83330
DS11	Diode, SMT, LED, Green, 0603	QDLS01	597-5312-402(STATIC)	83330
DS12	Diode, SMT, LED, Green, 0603	QDLS01	597-5312-402(STATIC)	83330
DS13	Diode, SMT, LED, Green, 0603	QDLS01	597-5312-402(STATIC)	83330
J01	Conn, Header, Ribbon Cbl, 40 pin	JP52	499910-9	00779
J02	Not Used	-	NOT USED	37338
J03	Conn, Header,Square Post,Gold,Dual,40-pin	JF47	4-102973-0	09482
J04	Conn, Header, Ribbon Cbl, 40 pin	JP52	499910-9	00779
J05	Conn, Header, Ribbon Cbl, 40 pin	JP52	499910-9	00779

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NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
J06	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
J07	Conn, Plug, D-Sub, 25 pin, Vert PWB	JS43	627 025 220 017	31781
J08	Conn, Header, Ribbon Cbl, 40 pin	JP52	499910-9	00779
J09	Conn, Header,Square Post,Gold,Dual,40-pin	JF47	4-102973-0	09482
J10	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
L01	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L02	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L03	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L04	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L05	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L06	Not Used	-	NOT USED	37338
L07	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L08	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L09	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L10	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L11	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L12	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L13	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L14	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L15	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L16	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L17	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
Q01	Transistor, FET, N Channel	QN54	2N7000(STATIC)	04713
Q02	Transistor, FET, N Channel	QN54	2N7000(STATIC)	04713
Q03	Transistor,SMT,NPN,Switch/Amp,SOT-23	QBNS01	MMBT4401LT1(STATIC)	04713
Q04	Transistor,SMT,NPN,Switch/Amp,SOT-23	QBNS01	MMBT4401LT1(STATIC)	04713
Q05	Transistor, FET, N Channel	QN54	2N7000(STATIC)	04713
R001	Not Used	-	NOT USED	37338
R002	Not Used	-	NOT USED	37338
R003	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R004	Resistor, SMT, MF, 221 Ohms,1% 1/4W	RAD17	RK73H2BL2210F	59124
R005	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R006	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R007	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R008	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R009	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R010	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R011	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124

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NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R012	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R013	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R014	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R015	Resistor,SMT,MF,681ohms,1%,1/10W,0603	RFFS36	RK73H1JLTD6810F	59124
R016	Resistor,SMT,MF,681ohms,1%,1/10W,0603	RFFS36	RK73H1JLTD6810F	59124
R017	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R018	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R019	Resistor, SMT, MF, 221 Ohms,1% 1/4W	RAD17	RK73H2BL2210F	59124
R020	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R021	Not Used	-	NOT USED	37338
R022	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R023	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R024	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R025	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R026	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R027	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R028	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R029	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R030	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R031	Resistor,SMT,MF,3320ohms,1%,1/10W,0603	RFFS44	RK73H1JLTD3321F	59124
R032	Resistor,SMT,MF,3320ohms,1%,1/10W,0603	RFFS44	RK73H1JLTD3321F	59124
R033	Resistor,SMT,MF,121Kohms,1%,1/10W,0603	RFFS63	RK73H1JLTD1213F	59124
R034	Resistor,SMT,MF,121Kohms,1%,1/10W,0603	RFFS63	RK73H1JLTD1213F	59124
R035	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R036	Resistor,SMT,MF,121Kohms,1%,1/10W,0603	RFFS63	RK73H1JLTD1213F	59124
R037	Resistor,SMT,MF,121Kohms,1%,1/10W,0603	RFFS63	RK73H1JLTD1213F	59124
R038	Resistor,SMT,MF,182Kohms,1%,1/10W,0603	RFFS65	RK73H1JLTD1823F	59124
R039	Resistor,SMT,MF,182Kohms,1%,1/10W,0603	RFFS65	RK73H1JLTD1823F	59124
R040	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R041	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R042	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R043	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R044	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R045	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R046	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R047	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R048	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R049	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R050	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124

NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R051	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R052	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R053	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R054	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R055	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R056	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R057	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R058	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R059	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R060	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R061	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R062	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R063	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R064	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R065	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R066	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R067	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R068	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R069	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R070	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R071	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R072	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R073	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R074	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R075	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R076	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R077	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R078	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R079	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R080	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R081	Resistor, Film, 6.81 Ohms, 1PC 1/2W	RC11	MF1/2DL6R81F	59124
R082	Resistor, Film, 6.81 Ohms, 1PC 1/2W	RC11	MF1/2DL6R81F	59124
R083	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R084	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R085	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R086	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R087	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R088	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R089	Not Used	-	NOT USED	37338

NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R090	Not Used	-	NOT USED	37338
R091	Not Used	-	NOT USED	37338
R092	Resistor,SMT,MF,47.5Kohms,1%,1/10W,0603	RFFS58	RK73H1JLTD4752F	59124
R093	Resistor,SMT,MF,12.1Kohms,1%,1/10W,0603	RFFS51	RK73H1JLTD1212F	59124
R094	Resistor,SMT,MF,0.0ohms,Jumper,0603	RFFS01	RK73Z1JLTD	59124
R095	Not Used	-	NOT USED	37338
R096	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R097	Resistor,SMT,MF,47.5Kohms,1%,1/10W,0603	RFFS58	RK73H1JLTD4752F	59124
R098	Resistor,SMT,MF,27.4Kohms,1%,1/10W,0603	RFFS55	RK73H1JLTD2742F	59124
R099	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R100	Not Used	-	NOT USED	37338
R101	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R102	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R103	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R104	Resistor,SMT,MF,2740ohms,1%,1/10W,0603	RFFS43	RK73H1JLTD2741F	59124
R105	Resistor,SMT,MF,0.0ohms,Jumper,0603	RFFS01	RK73Z1JLTD	59124
R106	Resistor,SMT,MF,1820ohms,1%,1/10W,0603	RFFS41	RK73H1JLTD1821F	59124
R107	Resistor,SMT,MF,1820ohms,1%,1/10W,0603	RFFS41	RK73H1JLTD1821F	59124
R108	Resistor,SMT,MF,1500ohms,1%,1/10W,0603	RFFS40	RK73H1JLTD1501F	59124
R109	Resistor,SMT,MF,1500ohms,1%,1/10W,0603	RFFS40	RK73H1JLTD1501F	59124
R110	Resistor,SMT,MF,1210ohms,1%,1/10W,0603	RFFS39	RK73H1JLTD1211F	59124
R111	Resistor,SMT,MF,1210ohms,1%,1/10W,0603	RFFS39	RK73H1JLTD1211F	59124
R112	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R113	Not Used	-	NOT USED	37338
R114	Not Used	-	NOT USED	37338
R115	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R116	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R117	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R118	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R119	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R120	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R121	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R122	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R123	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R124	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R125	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R126	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R127	Not Used	-	NOT USED	37338
R128	Not Used	-	NOT USED	37338

NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R129	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R130	Not Used	-	NOT USED	37338
R131	Not Used	-	NOT USED	37338
R132	Resistor,SMT,MF,475ohms,1%,1/10W,0603	RFFS34	RK73H1JLTD4750F	59124
R133	Resistor,SMT,MF,1210ohms,1%,1/10W,0603	RFFS39	RK73H1JLTD1211F	59124
R134	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R135	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R136	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R137	Resistor, MF, 3.92K Ohms, 1PC1/4W	RAB32	MF1/4DL3921F	59124
R138	Resistor,SMT,MF,1500ohms,1%,1/10W,0603	RFFS40	RK73H1JLTD1501F	59124
R139	Resistor,SMT,MF,1210ohms,1%,1/10W,0603	RFFS39	RK73H1JLTD1211F	59124
R140	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R141	Resistor,SMT,MF,15.0Kohms,1%,1/10W,0603	RFFS52	RK73H1JLTD1502F	59124
R142	Resistor,SMT,MF,475ohms,1%,1/10W,0603	RFFS34	RK73H1JLTD4750F	59124
R143	Resistor,SMT,MF,8250ohms,1%,1/10W,0603	RFFS49	RK73H1JLTD8251F	59124
R144	Resistor,SMT,MF,6810ohms,1%,1/10W,0603	RFFS48	RK73H1JLTD6811F	59124
R145	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R146	Resistor,SMT,MF,5620ohms,1%,1/10W,0603	RFFS47	RK73H1JLTD5621F	59124
R147	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R148	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R149	Not Used	-	NOT USED	37338
R150	Not Used	-	NOT USED	37338
R151	Not Used	-	NOT USED	37338
R152	Not Used	-	NOT USED	37338
R153	Not Used	-	NOT USED	37338
R154	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R155	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R156	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R157	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R158	Not Used	-	NOT USED	37338
R159	Not Used	-	NOT USED	37338
R160	Not Used	-	NOT USED	37338
R161	Not Used	-	NOT USED	37338
R162	Not Used	-	NOT USED	37338
R163	Resistor,SMT,MF,1500ohms,1%,1/10W,0603	RFFS40	RK73H1JLTD1501F	59124
R164	Resistor,SMT,MF,1500ohms,1%,1/10W,0603	RFFS40	RK73H1JLTD1501F	59124
R165	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R166	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R167	Not Used	-	NOT USED	37338

NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R168	Resistor,SMT,MF,0.0ohms,Jumper,0603	RFFS01	RK73Z1JLTD	59124
R169	Not Used	-	NOT USED	37338
R170	Not Used	-	NOT USED	37338
R171	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R172	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R173	Not Used	-	NOT USED	37338
R174	Resistor,SMT,MF,100Kohms,1%,1/10W,0603	RFFS62	RK73H1JLTD1003F	59124
R175	Resistor,SMT,MF,100Kohms,1%,1/10W,0603	RFFS62	RK73H1JLTD1003F	59124
R176	Not Used	-	NOT USED	37338
R177	Not Used	-	NOT USED	37338
R178	Not Used	-	NOT USED	37338
R179	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R180	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R181	Resistor,SMT,MF,0.0ohms,Jumper,0603	RFFS01	RK73Z1JLTD	59124
R182	Resistor,SMT,MF,1500ohms,1%,1/10W,0603	RFFS40	RK73H1JLTD1501F	59124
R183	Resistor,SMT,MF,1500ohms,1%,1/10W,0603	RFFS40	RK73H1JLTD1501F	59124
R184	Not Used	-	NOT USED	37338
R185	Resistor,SMT,MF,0.0ohms,Jumper,0603	RFFS01	RK73Z1JLTD	59124
R186	Resistor,SMT,MF,0.0ohms,Jumper,0603	RFFS01	RK73Z1JLTD	59124
R187	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R188	Not Used	-	NOT USED	37338
R189	Not Used	-	NOT USED	37338
R190	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R191	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R192	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R193	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R194	Not Used	-	NOT USED	37338
R195	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R196	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R197	Not Used	-	NOT USED	37338
R198	Not Used	-	NOT USED	37338
R199	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R200	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R201	Not Used	-	NOT USED	37338
R202	Not Used	-	NOT USED	37338
R203	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R204	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R205	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R206	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124

NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R207	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R208	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R209	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R210	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R211	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R212	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R213	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R214	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R215	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R216	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R217	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R218	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R219	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R220	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R221	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R222	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R223	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R224	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R225	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R226	Resistor,SMT,MF,1500ohms,1%,1/10W,0603	RFFS40	RK73H1JLTD1501F	59124
R227	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R228	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R229	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R230	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R231	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R232	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R233	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R234	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R235	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R236	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R237	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R238	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R239	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R240	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R241	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R242	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R243	Resistor,SMT,MF,100Kohms,1%,1/10W,0603	RFFS62	RK73H1JLTD1003F	59124
R244	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R245	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124

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NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R246	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R247	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R248	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R249	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R250	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R251	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R252	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R253	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R254	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R255	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R256	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R257	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R258	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R259	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R260	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R261	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R262	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R263	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R264	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R265	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R266	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R267	Not Used	-	NOT USED	37338
R268	Not Used	-	NOT USED	37338
R269	Not Used	-	NOT USED	37338
R270	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R271	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R272	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R273	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R274	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R275	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R276	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R277	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R278	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R279	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R280	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R281	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R282	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
R283	Resistor,SMT,MF,2210ohms,1%,1/10W,0603	RFFS42	RK73H1JLTD2211F	59124
U01	IC,SMT,RS-232 Transceiver,3.3V,SO-16	UDTS05	ADM3202ARN(STATIC)	45496

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NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
U02	IC,SMT,Trans Array, 7 Darl.,SOIC-16	UDAS01	MC1413BD(STATIC)	04713
U03	IC,SMT,RS-485 Transceiver,Sgl,SOIC-8	UDTS03	DS36C278TM(STATIC)	27014
U04	IC, SMT, Micro, ADC, PWM,Flash, TQFP-64	UDMS02	ATMEGA128-16AI(STATIC)	1FN41
U05	IC,SMT,Real-Time Clock,SPI,SOIC-16	UDTS01	M41T94MQ6(STATIC)	U3040
U06	IC,SMT,Non-Volatile RAM Ctrlr,SOIC-8	UDSS01	DS1312S-2(STATIC)	0B0A9
U07	IC,SMT,Opamp,Quad,Single Supply,SOIC-14	ULAS01	MC33074AD(STATIC)	04713
U08	IC, SMT, SRAM, 32Kx8, SOIC-28(Wide)	UDMS01	CY62256LL-70SNI(STATIC)	65786
U09	IC,CMOS,Hex Schmitt,Trigger Inverter,SOIC-14	UG35	MM74HC14M(STATIC)	07263
U10	IC,CMOS,Hex Schmitt,Trigger Inverter,SOIC-14	UG35	MM74HC14M(STATIC)	07263
U11	IC,CMOS,Hex Schmitt,Trigger Inverter,SOIC-14	UG35	MM74HC14M(STATIC)	07263
U12	IC,CMOS,Hex Schmitt,Trigger Inverter,SOIC-14	UG35	MM74HC14M(STATIC)	07263
U13	IC,CMOS,Hex Schmitt,Trigger Inverter,SOIC-14	UG35	MM74HC14M(STATIC)	07263
U14	IC,SMT,Complex Program LogicDev, PLCC-84	UDPS01	XC9572-15PC84C(STATIC)	68994
U15	Conn, Header,Square Post,Gold,Dual,40-pin	JF47	4-102973-0	09482
U15	Display,Liquid Crystal,240x64Graphic	UDDS01	DMF-5005NY-LY-AKE(STATIC)	30521
U16	IC, SMT, CMOS, Octal Latch,SOIC-20	UDLS02	SN74AHC573DW(STATIC)	01295
U17	IC,SMT,CMOS,Octal Flip Flop,SOIC-20	UDLS01	SN74AHC574DW(STATIC)	01295
U18	IC,SMT,CMOS,Octal Flip Flop,SOIC-20	UDLS01	SN74AHC574DW(STATIC)	01295
U19	IC,SMT,CMOS,Octal Flip Flop,SOIC-20	UDLS01	SN74AHC574DW(STATIC)	01295
U20	IC,SMT,Trans Array, 7 Darl.,SOIC-16	UDAS01	MC1413BD(STATIC)	04713
U21	IC,SMT,Trans Array, 7 Darl.,SOIC-16	UDAS01	MC1413BD(STATIC)	04713
U22	IC,SMT,Trans Array, 7 Darl.,SOIC-16	UDAS01	MC1413BD(STATIC)	04713
U23	IC,SMT,Trans Array, 7 Darl.,SOIC-16	UDAS01	MC1413BD(STATIC)	04713
U24	IC,SMT,Opamp,Quad,Rail-To-Rail,SOIC-14	ULAS02	TLV2374ID(STATIC)	01295
U25	IC,SMT,Opamp,Quad,Rail-To-Rail,SOIC-14	ULAS02	TLV2374ID(STATIC)	01295
U26	IC,SMT,Opamp,Quad,Rail-To-Rail,SOIC-14	ULAS02	TLV2374ID(STATIC)	01295
U27	IC,SMT,Comparator,Quad,SOIC-14	ULCS01	MC3302D(STATIC)	04713
U28	IC,SMT,ADC,10-Bit,11-ch,SPI,SOIC-20	UMAS01	TLC1543IDW(STATIC)	01295
U29	IC,SMT,ADC,10-Bit,11-ch,SPI,SOIC-20	UMAS01	TLC1543IDW(STATIC)	01295
U30	IC,SMT,DAC,8-bit,8-ch,SPI,SOIC-20	UW57	TLV5629IDW(STATIC)	64155

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NAPC143A/01 Controller/Display PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
U31	IC,SMT,5V Reference,0.1%,SOT-23-6	ULRS01	LT1790BIS6-5(STATIC)	64155
U32	IC,SMT,Opamp,Quad,Single Supply,SOIC-14	ULAS01	MC33074AD(STATIC)	04713
U33	IC,SMT,Opamp,Quad,Single Supply,SOIC-14	ULAS01	MC33074AD(STATIC)	04713
U34	Not Used	-	NOT USED	37338
U35	IC,SMT,Comparator,Quad,SOIC-14	ULCS01	MC3302D(STATIC)	04713
U36	IC,SMT,Opamp,Quad,Single Supply,SOIC-14	ULAS01	MC33074AD(STATIC)	04713
U37	IC,SMT,Opamp,Quad,Rail-To-Rail,SOIC-14	ULAS02	TLV2374ID(STATIC)	01295
U38	IC,SMT,Opamp,Quad,Rail-To-Rail,SOIC-14	ULAS02	TLV2374ID(STATIC)	01295
XBT1	Holder, 20mm Coin Cell, PWB Mt	BBHT01	1065	91833
XU15	Conn, Socket, Breakaway, PWBMt, .1 Ctr	JT58	929850-01-36-10	09581
Y01	Crystal,SMT,Fund,Par Res,11.0592MHz	XFPS01	CMR309T11.0592MABJTR	3DX59
Y02	Crystal,SMT,Fund,Par Res,32.768kHz	XFPS02	MC20632.7680KA-A0	1JRT7

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Not Used	-	NOT USED	37338
C02	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C03	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C04	Capacitor, Tantalum, 2.2uF 10PC 20V	CCP16	CSR13E225KM	56289
C05	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C06	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C07	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C08	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C09	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C10	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C11	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C12	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C13	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C14	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C15	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C16	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C17	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C18	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C19	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C20	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C21	Capacitor, Mica, Dipped, 390pF 2% 500V	CB32	CM05FD391G03	14655
C22	Capacitor, Mica, Dipped, 100pF 2% 500V	CB25	CM05FD101G03	SOSH
C23	Capacitor, Mica, Dipped, 390pF 2% 500V	CB32	CM05FD391G03	14655
C24	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C25	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C26	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C27	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C28	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C29	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C30	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C31	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C32	Capacitor, Ceramic, 0.22uF 10% 50V	CCG08	CKR06BX224KRV	56289
C33	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C34	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C35	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C36	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289

NAPE70B RF Synthesizer PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C37	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C38	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C39	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C40	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C41	Capacitor, Tantalum, 47uF 10%20V	CM01	T356K476K020AT(RoHS) KEMET	96095
C42	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C43	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C44	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C45	Capacitor, Ceramic, 0.0047uF10% 100V	CCG03	CKR05BX472KRV	56289
C46	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C47	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C48	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C49	Capacitor, Ceramic, 0.0068uF 10% 100V	CCG30	CKR05BX682KRV	56289
C50	Capacitor, Ceramic, 12pF, 2%,100V	CS71	D120G20C0GH63J5	56699
C51	Capacitor, Ceramic, 12pF, 2%,100V	CS71	D120G20C0GH63J5	56699
C52	Capacitor, Ceramic, 12pF, 2%,100V	CS71	D120G20C0GH63J5	56699
C53	Capacitor, Ceramic, 12pF, 2%,100V	CS71	D120G20C0GH63J5	56699
C54	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C55	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C56	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C57	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C58	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
CR01	Diode, Schottky	QR15	MBD301(STATIC)	04713
CR02	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR03	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR04	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR05	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR06	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
E01	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E02	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E03	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E04	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E05	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E06	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
J01	Conn, Socket, D-Sub, 25 pin, PWB Mt	JS13	K22-B25S-NJ	22421
J02	Conn, BNC, Recept, PWB Mt	JF35	R141426161	0GP12

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NAPE70B RF Synthesizer PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
L01	Inductor, Moulded, Shielded, 1.8uH	LAP28	IMS-5-1.8UH+/-10%	35005
L02	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L03	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L04	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L05	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L06	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L07	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L08	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L09	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L10	Inductor, Moulded, Shielded, 1000uH	LAP39	IMS-5-1000UH+/-10%	35005
Q01	Transistor, NPN, Switch/Amplifier	QA15	2N3904	04713
Q02	Transistor, NPN, Switch/Amplifier	QA15	2N3904	04713
Q03	Transistor, NPN, Switch/Amplifier	QA15	2N3904	04713
Q04	Transistor, NPN, Switch/Amplifier	QA15	2N3904	04713
Q05	Transistor, NPN, General Purpose	QAP04	2N2219A	04713
Q06	Transistor, PNP, Switch/Amplifier	QA23	2N2905A	04713
R01	Resistor, MF, 100 Ohms, 1PC 1/4W	RAB13	MF1/4DL1000F	59124
R02	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R03	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R04	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R05	Resistor, MF, 274 Ohms, 1PC 1/4W	RAB18	MF1/4DL2740F	59124
R06	Resistor, MF, 100 Ohms, 1PC 1/4W	RAB13	MF1/4DL1000F	59124
R07	Resistor, MF, 1.21K Ohms, 1PC1/4W	RAB26	MF1/4DL1211F	59124
R08	Resistor, MF, 100 Ohms, 1PC 1/4W	RAB13	MF1/4DL1000F	59124
R09	Resistor, MF, 100 Ohms, 1PC 1/4W	RAB13	MF1/4DL1000F	59124
R10	Resistor, MF, 47.5 Ohms, 1PC 1/4W	RAB09	MF1/4DL47R5F	59124
R11	Resistor, MF, 47.5 Ohms, 1PC 1/4W	RAB09	MF1/4DL47R5F	59124
R12	Resistor, MF, 47.5 Ohms, 1PC 1/4W	RAB09	MF1/4DL47R5F	59124
R13	Resistor, MF, 3.92K Ohms, 1PC1/4W	RAB32	MF1/4DL3921F	59124
R14	Resistor, MF, 47.5 Ohms, 1PC 1/4W	RAB09	MF1/4DL47R5F	59124
R15	Resistor, MF, 100 Ohms, 1PC 1/4W	RAB13	MF1/4DL1000F	59124
R16	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R17	Resistor, MF, 10.0 Ohms, 1PC 1/4W	RAB01	MF55D10R0F	59124
R18	Resistor, MF, 10.0 Ohms, 1PC 1/4W	RAB01	MF55D10R0F	59124
R19	Resistor, MF, 10.0 Ohms, 1PC 1/4W	RAB01	MF55D10R0F	59124
R20	Resistor, MF, 82.5 Ohms, 1PC 1/4W	RAB12	MF1/4DL82R5F	59124
R21	Resistor, Film, 22 Ohms, 5% 2W	RBP03	GS-3, 22 OHMS	75042
R22	Resistor, MF, 27.4K Ohms, 1PC1/4W	RAB42	MF1/4DL2742F	59124
R23	Resistor, MF, 1.82K Ohms, 1PC1/4W	RAB28	MF1/4DL1821F	59124

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NAPE70B RF Synthesizer PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R24	Not Used	-	NOT USED	37338
R25	Resistor, MF, 1.50K Ohms, 1PC1/4W	RAB27	MF1/4DL1501F	59124
R26	Resistor, MF, 100 Ohms, 1PC 1/4W	RAB13	MF1/4DL1000F	59124
R27	Resistor, Film, 1000 Ohms, 2PC 1/2W	RAP09	RL20S102G	35005
R28	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R29	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R30	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R31	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R32	Resistor, Variable, Film, 1000 Ohms, 1/2W	RV06	3339P-1-102	80294
R33	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R34	Resistor, MF, 2.21K Ohms, 1PC1/4W	RAB29	MF1/4DL2211F	59124
R35	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R36	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R37	Resistor, MF, 3.32K Ohms, 1PC1/4W	RAB31	MF1/4DL3321F	59124
R38	Resistor, MF, 3.32K Ohms, 1PC1/4W	RAB31	MF1/4DL3321F	59124
R39	Resistor, MF, 22.1 Ohms, 1PC 1/4W	RAB05	MF1/4DL22R1F	59124
R40	Resistor, MF, 100 Ohms, 1PC 1/4W	RAB13	MF1/4DL1000F	59124
R41	Resistor, Variable, Film, 50KOhms, 1/2W	RW35	3339P-1-503	80294
R42	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R43	Resistor, MF, 2.74K Ohms, 1PC1/4W	RAB30	MF1/4DL2741F	59124
R44	Resistor, MF, 22.1 Ohms, 1PC 1/4W	RAB05	MF1/4DL22R1F	59124
R45	Resistor, MF, 1.21K Ohms, 1PC1/4W	RAB26	MF1/4DL1211F	59124
R46	Resistor, MF, 47.5 Ohms, 1PC 1/4W	RAB09	MF1/4DL47R5F	59124
R47	Resistor, MF, 27.4 Ohms, 1PC 1/4W	RAB06	MF1/4DL27R4F	59124
R48	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R49	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R50	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R51	Resistor, MF, 100 Ohms, 1PC 1/4W	RAB13	MF1/4DL1000F	59124
R52	Not Used	-	NOT USED	37338
S01	Switch, DIP, Rotary, 10-pos, BCD	SB40	230002G	97525
S02	Switch, DIP, Rotary, 10-pos, BCD	SB40	230002G	97525
S03	Switch, DIP, Rotary, 10-pos, BCD	SB40	230002G	97525
S04	Switch, DIP, Rotary, 10-pos, BCD	SB40	230002G	97525
S05	Switch, DIP, Rotary, 10-pos, BCD	SB40	230002G	97525
S06	Switch, DIP, 4-way, 1PST	SC31	76SB04T (ROHS)	81073
U01	Oscillator, TCXO, 10.000MHz,2ppm	UT55	RTXT-781DJZ5-C-10.000(STATIC)	RALTRON
U02	Res, Network, SIP, 9 x 4700 Ohms, 2% Bus	RT07	4610X-101-472	80294
U03	IC, CMOS, Hex Inverter	UG03	MC74AC04N(STATIC)	04713
U04	IC, Programmed MicrocontrollerDDS	190-5043-02	190-5043-02	37338

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NAPE70B RF Synthesizer PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
U05	IC, CMOS, 48-bit DDS	UT58	AD9852ASQ(STATIC)	45496
U06	IC, CMOS, Synchronous Counter	UT56	74ACT163PC(STATIC)	07263
U07	IC, CMOS, Synchronous Counter	UT56	74ACT163PC(STATIC)	07263
U08	IC, CMOS, Hex Inverter	UX11	MC74HC04AN(STATIC)	01295
U09	IC, Voltage Regulator, +5V, 1A, Plastic	UX17	MC7805ACT	04713
U10	IC, CMOS, Hex Schmitt Trigger	UM23	MC14584BCP(STATIC)	04713
U11	IC, Voltage Regulator, +3.3V,1A	UT59	LM3940IT-3.3	27014
U12	IC, CMOS, Dual, Type D, Flip Flop	UB15	MC14013BCP(STATIC)	04713
U13	IC, Transistor Pair, Bipolar,Matched	UT60	LM394CH(STATIC)	27014
XE01	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE02	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE03	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE04	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE06	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE5A	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE5B	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XS01	Socket, IC, 6-pin	UD43	390261-1	00779
XS02	Socket, IC, 6-pin	UD43	390261-1	00779
XS03	Socket, IC, 6-pin	UD43	390261-1	00779
XS04	Socket, IC, 6-pin	UD43	390261-1	00779
XS05	Socket, IC, 6-pin	UD43	390261-1	00779
XU01	Not Used	-	NOT USED	37338
XU02	Not Used	-	NOT USED	37338
XU03	Socket, IC, 14-pin	UC02	2-641261-1	00779
XU04	Not Used	-	NOT USED	37338
XU05	Not Used	-	NOT USED	37338
XU06	Socket, IC, 16-pin	UC03	2-641262-1	00779
XU07	Socket, IC, 16-pin	UC03	2-641262-1	00779
XU08	Socket, IC, 14-pin	UC02	2-641261-1	00779
XU09	Not Used	-	NOT USED	37338
XU10	Socket, IC, 14-pin	UC02	2-641261-1	00779
XU11	Not Used	-	NOT USED	37338
XU12	Socket, IC, 14-pin	UC02	2-641261-1	00779
XU13	Not Used	-	NOT USED	37338

NAPF03A/01 RF Filter Input PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Select on Test	$	SELECT ON TEST	37338
C02	Select on Test	$	SELECT ON TEST	37338
C03	Select on Test	$	SELECT ON TEST	37338
CR01	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
E01	Terminal, Screw, 10-32	HAC48	1293	91833
E02	Terminal, Screw, 10-32	HAC48	1293	91833
E03	Terminal, Screw, 10-32	HAC48	1293	91833
E04	Terminal, Screw, 10-32	HAC48	1293	91833
E05	Terminal, Screw, 10-32	HAC48	1293	91833
E06	Connector, Quick-Dis, M,1/4 Tab, PWB	HR26	1287	91833
E07	Connector, Quick-Dis, M,1/4 Tab, PWB	HR26	1287	91833
E08	Connector, Quick-Dis, M,1/4 Tab, PWB	HR26	1287	91833
E09	Terminal, Screw, 10-32	HAC48	1293	91833
J01	Conn, Coax, Recept, 20 Deg.Low Profile	JT43	TMP-S01X-B1	TAIKO
R01	Resistor, Film, 10 Ohms, 2%1/2W	RAP01	RL20S100G	35005
R02	Resistor, Film, 39 Ohms, 2PC 1/2W	RC20	RL20S390G	35005
T01	Current Transformer	165-6022	165-6022	37338

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Capacitor, Mica, Dipped,1800pF 2% 500V	CB40	CM06FD182G03	14655
C02	Capacitor, Mica, Dipped,1800pF 2% 500V	CB40	CM06FD182G03	14655
C03	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
C04	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
CR01	Diode,Schottky,100V,0.1A,DO-35	QK48	BAT41(STATIC)	U3040
CR02	Diode,Schottky,100V,0.1A,DO-35	QK48	BAT41(STATIC)	U3040
CR03	Diode,Schottky,100V,0.1A,DO-35	QK48	BAT41(STATIC)	U3040
CR04	Diode,Schottky,100V,0.1A,DO-35	QK48	BAT41(STATIC)	U3040
CR05	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
CR06	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
CR07	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
CR08	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
CR09	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
E01	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
E02	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
E03	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
E04	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
J01	Conn, Socket, D-Sub, 25 pin, PWB Mt	JS13	K22-B25S-NJ	22421
J02	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
L01	Inductor, Moulded, Shielded, 10000uH	LAP41	IMS-5-10000UH+/-10%	35005
L02	Inductor, Moulded, Shielded, 10000uH	LAP41	IMS-5-10000UH+/-10%	35005
L03	Inductor, Moulded, Shielded, 10000uH	LAP41	IMS-5-10000UH+/-10%	35005
L04	Inductor, Moulded, Shielded, 10000uH	LAP41	IMS-5-10000UH+/-10%	35005
R01	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
R02	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
R03	Resistor, Film, 1000 Ohms, 5%, 2W	RBP13	GS-3, 1000 OHMS	75042
R04	Resistor, Film, 1000 Ohms, 5%, 2W	RBP13	GS-3, 1000 OHMS	75042
R05	Resistor, Film, 1000 Ohms, 5%, 2W	RBP13	GS-3, 1000 OHMS	75042
R06	Resistor, Film, 1000 Ohms, 5%, 2W	RBP13	GS-3, 1000 OHMS	75042
R07	Resistor, Film, 1000 Ohms, 5%, 2W	RBP13	GS-3, 1000 OHMS	75042

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NAPF07A/00 RF Power Probe PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R08	Resistor, Film, 4700 Ohms, 2PC 1/2W	RD03	RL20S472G	35005
R09	Resistor, Film, 100 Ohms, 5%2W	RBP07	GS-3, 100 OHMS	75042
R10	Resistor, Film, 100 Ohms, 5%2W	RBP07	GS-3, 100 OHMS	75042
R11	Resistor, Film, 4700 Ohms, 2PC 1/2W	RD03	RL20S472G	35005
T01	Transformer Assy	195-9065	195-9065	37338
T02	RF Current Transformer	195-9064	195-9064	37338
T03	Voltage Transformer	195-9060	195-9060	37338
TB01	Terminal Block, 4-pos, Double, 30A	JB33	382100104	13150

NAPF07A/02 RF Power Probe (JAZZ) PWBAssy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C03	Select on Test	$	SELECT ON TEST	37338
C04	Capacitor, Dipped Mica, 100pF5PC, 1000V	CT15	CDV18FF101J03	14655
C05	Capacitor, Dipped Mica, 100pF5PC, 1000V	CT15	CDV18FF101J03	14655
CR05	Diode, Zener, TransientSuppressor, 300V	QH46	1.5KE300CA	GENSEMI
CR06	Diode, Zener, TransientSuppressor, 300V	QH46	1.5KE300CA	GENSEMI
CR07	Diode, Zener, TransientSuppressor, 300V	QH46	1.5KE300CA	GENSEMI
CR08	Diode, Zener, TransientSuppressor, 300V	QH46	1.5KE300CA	GENSEMI
CR09	Diode, Zener, TransientSuppressor, 300V	QH46	1.5KE300CA	GENSEMI
E01	Terminal, Screw, 10-32	HAC48	1293	91833
E02	Terminal, Screw, 10-32	HAC48	1293	91833
E03	Terminal, Screw, 10-32	HAC48	1293	91833
E04	Terminal, Screw, 10-32	HAC48	1293	91833
J02	Conn, Coax, Recept, 20 Deg.Low Profile	JT43	TMP-S01X-B1	TAIKO
R01	Not Used	-	NOT USED	37338
R02	Not Used	-	NOT USED	37338

NAPF08 Modulator Filter PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Capacitor, Polyprop, 0.1uF,600V	CT45	715P10496LD3	SB ELEC
C02	Capacitor, Polyprop, 0.033uF,5%, 600V	CP26	716P33356KA3	SBE
C03	Capacitor, Polyprop, 0.1uF,600V	CT45	715P10496LD3	SB ELEC
C04	Capacitor, Polyprop, 0.033uF,5%, 600V	CP26	716P33356KA3	SBE
C05	Capacitor, Mica, Dipped, 3900pF 5% 500V	CCC36	CD19FD392J03	14655
CR01	Diode, Power Rectifier, 1000V,8A	QM45	MUR8100E(STATIC)	1MQ07
L01	Clip, Spring, Retaining, TDK	HX59	FPQ35/35A	54583
L01	Pot Core (halves), 35mm, PC40Mtl	LY41	PC44PQ35/35G2.27-22SG TDK	54583
L01	Bobbin for 35mm Pot Core	LY42	BPQ35/35 - OD	54583
L01	Wire, Solderable, 155C 270/40Litz 16AWG	WB37	3X3X30/40	NEW ENG
L02	Clip, Spring, Retaining, TDK	HX59	FPQ35/35A	54583
L02	Pot Core (halves), 35mm, PC40Mtl	LY41	PC44PQ35/35G2.27-22SG TDK	54583
L02	Bobbin for 35mm Pot Core	LY42	BPQ35/35 - OD	54583
L02	Wire, Solderable, 155C 270/40Litz 16AWG	WB37	3X3X30/40	NEW ENG
L03	Clip, Spring, Retaining, TDK	HX59	FPQ35/35A	54583
L03	Pot Core (halves), 35mm, PC40Mtl	LY41	PC44PQ35/35G2.27-22SG TDK	54583
L03	Bobbin for 35mm Pot Core	LY42	BPQ35/35 - OD	54583
L03	Wire, Solderable, 155C 270/40Litz 16AWG	WB37	3X3X30/40	NEW ENG

NAPI73 Power Module Interface PWBAssy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C02	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
J01	Conn, Header, Ribbon Cbl, 10 pin	JA49	499910-1	00779
J02	Conn, Header, Ribbon Cbl, 10 pin	JA49	499910-1	00779
J03	Conn, Plug, D-Sub, 15 pin, PWB Mt	JS18	K22-A15P-NJ	63590
L01	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L02	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C001	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C002	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C003	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C004	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C005	Cap,SMT,Ceramic,150pF,1%,50V,C0G,0603	CCFS33	0603A151FAT2A	56289
C006	Not Used	-	NOT USED	37338
C007	Cap,SMT,Ceramic,150pF,1%,50V,C0G,0603	CCFS33	0603A151FAT2A	56289
C008	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C009	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C010	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C011	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C012	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C013	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C014	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C015	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C016	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C017	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C018	Cap,SMT,Ceramic,150pF,1%,50V,C0G,0603	CCFS33	0603A151FAT2A	56289
C019	Cap,SMT,Ceramic,150pF,1%,50V,C0G,0603	CCFS33	0603A151FAT2A	56289
C020	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C021	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C022	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C023	Not Used	-	NOT USED	37338
C024	Not Used	-	NOT USED	37338
C025	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C026	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C027	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C028	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C029	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C030	Not Used	-	NOT USED	37338
C031	Not Used	-	NOT USED	37338
C032	Cap,SMT,Ceramic,0.047uF,10%,50V,X7R,0603	CCFS06	C0603C473K5RAC	31433
C033	Not Used	-	NOT USED	37338
C034	Not Used	-	NOT USED	37338
C035	Not Used	-	NOT USED	37338
C036	Cap,SMT,Ceramic,1000pF,2%,50V,C0G,0805	CCFS42	C0805C102G5GAC	31433
C037	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C038	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C039	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C040	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C041	Cap,SMT,Ceramic,1000pF,2%,50V,C0G,0805	CCFS42	C0805C102G5GAC	31433
C042	Cap,SMT,Ceramic,1000pF,2%,50V,C0G,0805	CCFS42	C0805C102G5GAC	31433
C043	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C044	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C045	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C046	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C047	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C048	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C049	Not Used	-	NOT USED	37338
C050	Not Used	-	NOT USED	37338
C051	Not Used	-	NOT USED	37338
C052	Not Used	-	NOT USED	37338
C053	Not Used	-	NOT USED	37338
C054	Not Used	-	NOT USED	37338
C055	Not Used	-	NOT USED	37338
C056	Cap,SMT,Tantalum,10uF,10%,16V,1411	CTFS01	T494B106K016AS	31433
C057	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C058	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C059	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C060	Not Used	-	NOT USED	37338
C061	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C062	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C063	Not Used	-	NOT USED	37338
C064	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C065	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C066	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C067	Not Used	-	NOT USED	37338
C068	Not Used	-	NOT USED	37338
C069	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C070	Not Used	-	NOT USED	37338
C071	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C072	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C073	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C074	Not Used	-	NOT USED	37338
C075	Not Used	-	NOT USED	37338
C076	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C077	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C078	Not Used	-	NOT USED	37338

NAPI85/01 Remote Interface PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C079	Not Used	-	NOT USED	37338
C080	Cap,SMT,Tantalum,10uF,10%,35V,2917	CTFS03	T494D106K035AS	31433
C081	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C082	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C083	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C084	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C085	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C086	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C087	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C088	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C089	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C090	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C091	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C092	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C093	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C094	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C095	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C096	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C097	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C098	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C099	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C100	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C101	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C102	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C103	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C104	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C105	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C106	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C107	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C108	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C109	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C110	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C111	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C112	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C113	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C114	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C115	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C116	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C117	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C118	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C119	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C120	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C121	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C122	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C123	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C124	Cap,SMT,Ceramic,18pF,2%,50V,C0G,0603	CCFS23	C0603C180G5GAC	31433
C125	Cap,SMT,Ceramic,0.01uF,10%,50V,X7R,0603	CCFS04	C0603C103K5RAC	31433
C126	Cap,SMT,Ceramic,18pF,2%,50V,C0G,0603	CCFS23	C0603C180G5GAC	31433
C127	Cap,SMT,Ceramic,0.001uF,10%,50V,X7R,0603	CCFS01	C0603C102K5RAC	31433
C128	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C129	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
C130	Not Used	-	NOT USED	37338
C131	Cap,SMT,Ceramic,0.1uF,10%,50V,X7R,0805	CCFS07	C0805C104K5RAC	31433
CR01	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR02	Diode, Zener, 13V, 1W, 10%	QK19	1N4743	04713
CR03	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR04	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR05	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR06	Diode,SMT,Zener,39V,5%,3W,SMB	QDZS04	1SMB5939BT3	04713
CR07	Diode,SMT,Zener,39V,5%,3W,SMB	QDZS04	1SMB5939BT3	04713
CR08	Diode,SMT,Zener,39V,5%,3W,SMB	QDZS04	1SMB5939BT3	04713
CR09	Diode,SMT,Zener,39V,5%,3W,SMB	QDZS04	1SMB5939BT3	04713
CR10	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR11	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR12	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR13	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR14	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR15	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR16	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR17	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR18	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR19	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR20	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR21	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR22	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR23	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR24	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR25	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713

NAPI85/01 Remote Interface PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
CR26	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR27	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR28	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR29	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR30	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR31	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR32	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR33	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR34	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR35	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR36	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR37	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR38	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR39	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
CR40	Diode,SMT,Switching,250V,0.2A,SOD-323	QDRS01	BAS21HT1(STATIC)	04713
E01	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E02	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E03	Not Used	-	NOT USED	37338
E04	Not Used	-	NOT USED	37338
E05	Not Used	-	NOT USED	37338
E06	Not Used	-	NOT USED	37338
E07	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E08	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E09	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E10	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E11	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E12	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E13	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E14	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E15	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E16	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E17	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E18	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E19	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E20	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E21	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E22	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E23	Not Used	-	NOT USED	37338
E24	Not Used	-	NOT USED	37338

NAPI85/01 Remote Interface PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
E25	Not Used	-	NOT USED	37338
E26	Not Used	-	NOT USED	37338
E27	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
E28	Not Used	-	NOT USED	37338
E29	Not Used	-	NOT USED	37338
E30	Conn, Post Shunt, 2 Pos, .10 Centreline	JQ15	390088-2	09482
J01	Conn, Header, Ribbon Cbl, 40-Pin	JQ53	103308-8	00779
J02	Connector,Modular,RJ-45,Vert.,PWB	JPMT01	557969-1	09482
J03	Connector,Modular,RJ-45,Vert.,PWB	JPMT01	557969-1	09482
J04	Conn, Header, Ribbon Cbl, 20Pin	JQ55	103308-5	00779
J05	Not Used	-	NOT USED	37338
J06	Conn, BNC, Recept, PWB Mt	JF35	R141426161	0GP12
J07	Conn, Coax, Recept, 20 Deg.Low Profile	JT43	TMP-S01X-B1	TAIKO
J08	Conn, Coax, Recept, 20 Deg.Low Profile	JT43	TMP-S01X-B1	TAIKO
J09	Conn, BNC, Recept, PWB Mt	JF35	R141426161	0GP12
J10	Conn, Socket, D-Sub, 9-Pin,Vertical PWB	JS50	164A16669X	C3057
J11	Conn, Header,Square Post,Gold,Dual,40-pin	JF47	4-102973-0	09482
J12	Not Used	-	NOT USED	37338
J13	Conn, BNC, Recept, PWB Mt	JF35	R141426161	0GP12
J14	Conn, BNC, Recept, PWB Mt	JF35	R141426161	0GP12
K01	Relay, 5V Coil, 2PDT, 1A	KC18	TQ2-5V	61529
K02	Relay, 5V Coil, 2PDT, 1A	KC18	TQ2-5V	61529
K03	Relay, 5V Coil, 2PDT, 1A	KC18	TQ2-5V	61529
K04	Relay, 5V Coil, 2PDT, 1A	KC18	TQ2-5V	61529
K05	Relay, 5V Coil, 2PDT, 1A	KC18	TQ2-5V	61529
K06	Relay, 5V Coil, 2PDT, 1A	KC18	TQ2-5V	61529
K07	Relay, 5V Coil, 2PDT, 1A	KC18	TQ2-5V	61529
K08	Relay, 5V Coil, 2PDT, 1A	KC18	TQ2-5V	61529
L01	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L02	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L03	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L04	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L05	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L06	Not Used	-	NOT USED	37338
L07	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L08	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L09	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L10	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L11	Not Used	-	NOT USED	37338

NAPI85/01 Remote Interface PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
L12	Not Used	-	NOT USED	37338
L13	Not Used	-	NOT USED	37338
L14	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L15	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L16	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
L17	Inductor, SMT, Choke, 600ohms,2A, 0805	LCFS01	ILHB0805RK601V	56845
Q01	Transistor,SMT,NPN,Switch/Amp,SOT-23	QBNS01	MMBT4401LT1(STATIC)	04713
Q02	Not Used	-	NOT USED	37338
Q03	Not Used	-	NOT USED	37338
Q04	Not Used	-	NOT USED	37338
Q05	Not Used	-	NOT USED	37338
Q06	Not Used	-	NOT USED	37338
Q07	Transistor,SMT,NPN,Switch/Amp,SOT-23	QBNS01	MMBT4401LT1(STATIC)	04713
Q08	Transistor,SMT,NPN,Switch/Amp,SOT-23	QBNS01	MMBT4401LT1(STATIC)	04713
R001	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R002	Resistor, MF, 301 Ohms, 1%1/4W	RAC23	MF1/4DL3010F	59124
R003	Resistor, MF, 301 Ohms, 1%1/4W	RAC23	MF1/4DL3010F	59124
R004	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R005	Resistor,SMT,MF,825ohms,1%,1/10W,0603	RFFS37	RK73H1JLTD8250F	59124
R006	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R007	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R008	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R009	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R010	Resistor,SMT,MF,0.0ohms,Jumper,0603	RFFS01	RK73Z1JLTD	59124
R011	Resistor, MF, 301 Ohms, 1%1/4W	RAC23	MF1/4DL3010F	59124
R012	Resistor, MF, 301 Ohms, 1%1/4W	RAC23	MF1/4DL3010F	59124
R013	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R014	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R015	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R016	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R017	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R018	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R019	Resistor,SMT,MF,475ohms,1%,1/10W,0603	RFFS34	RK73H1JLTD4750F	59124
R020	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R021	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R022	Resistor,SMT,MF,12.1Kohms,1%,1/10W,0603	RFFS51	RK73H1JLTD1212F	59124
R023	Resistor, Variable, Film, 5000 Ohms, 1/2W	RV10	3339P-1-502	80294
R024	Resistor, SMT, MF, 10.0K Ohms, 1%, 1/4W	RAD37	RK73H2BL1002F	59124

NAPI85/01 Remote Interface PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R025	Resistor, SMT, MF, 10.0K Ohms, 1%, 1/4W	RAD37	RK73H2BL1002F	59124
R026	Resistor,SMT,MF,0.0ohms,Jumper,0603	RFFS01	RK73Z1JLTD	59124
R027	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R028	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R029	Not Used	-	NOT USED	37338
R030	Resistor,SMT,MF,47.5Kohms,1%,1/10W,0603	RFFS58	RK73H1JLTD4752F	59124
R031	Not Used	-	NOT USED	37338
R032	Not Used	-	NOT USED	37338
R033	Not Used	-	NOT USED	37338
R034	Not Used	-	NOT USED	37338
R035	Not Used	-	NOT USED	37338
R036	Resistor, Variable, Film, 10KOhms, 1/2W	RW09	3339P-1-103	80294
R037	Resistor,SMT,MF,47.5Kohms,1%,1/10W,0603	RFFS58	RK73H1JLTD4752F	59124
R038	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R039	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R040	Resistor, Film, 120 Ohms, 2PC1/2W	RC26	RL20S121G	35005
R041	Resistor,SMT,MF,12.1Kohms,1%,1/10W,0603	RFFS51	RK73H1JLTD1212F	59124
R042	Resistor,SMT,MF,475ohms,1%,1/10W,0603	RFFS34	RK73H1JLTD4750F	59124
R043	Resistor,SMT,MF,1210ohms,1%,1/10W,0603	RFFS39	RK73H1JLTD1211F	59124
R044	Resistor,SMT,MF,1210ohms,1%,1/10W,0603	RFFS39	RK73H1JLTD1211F	59124
R045	Resistor, Variable, Film, 20KOhms, 1/2W	RD38	3339P-1-203	80294
R046	Resistor,SMT,MF,274ohms,1%,1/10W,0603	RFFS31	RK73H1JLTD2740F	59124
R047	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R048	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R049	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R050	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R051	Resistor,SMT,MF,6810ohms,1%,1/10W,0603	RFFS48	RK73H1JLTD6811F	59124
R052	Resistor,SMT,MF,15.0Kohms,1%,1/10W,0603	RFFS52	RK73H1JLTD1502F	59124
R053	Not Used	-	NOT USED	37338
R054	Resistor,SMT,MF,15.0Kohms,1%,1/10W,0603	RFFS52	RK73H1JLTD1502F	59124
R055	Not Used	-	NOT USED	37338
R056	Resistor,SMT,MF,1000ohms,1%,1/10W,0603	RFFS38	RK73H1JLTD1001F	59124
R057	Not Used	-	NOT USED	37338
R058	Resistor,SMT,MF,33.2Kohms,1%,1/10W,0603	RFFS56	RK73H1JLTD3322F	59124
R059	Resistor,SMT,MF,56.2Kohms,1%,1/10W,0603	RFFS59	RK73H1JLTD5622F	59124
R060	Resistor,SMT,MF,100Kohms,1%,1/10W,0603	RFFS62	RK73H1JLTD1003F	59124
R061	Resistor,SMT,MF,150Kohms,1%,1/10W,0603	RFFS64	RK73H1JLTD1503F	59124
R062	Resistor,SMT,MF,681Kohms,1%,1/10W,0603	RFFS72	RK73H1JLTD6813F	59124
R063	Resistor,SMT,MF,150Kohms,1%,1/10W,0603	RFFS64	RK73H1JLTD1503F	59124

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REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R064	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R065	Resistor,SMT,MF,100Kohms,1%,1/10W,0603	RFFS62	RK73H1JLTD1003F	59124
R066	Not Used	-	NOT USED	37338
R067	Resistor,SMT,MF,100Kohms,1%,1/10W,0603	RFFS62	RK73H1JLTD1003F	59124
R068	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R069	Not Used	-	NOT USED	37338
R070	Not Used	-	NOT USED	37338
R071	Not Used	-	NOT USED	37338
R072	Not Used	-	NOT USED	37338
R073	Not Used	-	NOT USED	37338
R074	Resistor,SMT,MF,475Kohms,1%,1/10W,0603	RFFS70	RK73H1JLTD4753F	59124
R075	Resistor,SMT,MF,15.0Kohms,1%,1/10W,0603	RFFS52	RK73H1JLTD1502F	59124
R076	Resistor,SMT,MF,56.2Kohms,1%,1/10W,0603	RFFS59	RK73H1JLTD5622F	59124
R077	Resistor,SMT,MF,27.4Kohms,1%,1/10W,0603	RFFS55	RK73H1JLTD2742F	59124
R078	Not Used	-	NOT USED	37338
R079	Not Used	-	NOT USED	37338
R080	Resistor,SMT,MF,3920ohms,1%,1/10W,0603	RFFS45	RK73H1JLTD3921F	59124
R081	Not Used	-	NOT USED	37338
R082	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R083	Resistor,SMT,MF,3920ohms,1%,1/10W,0603	RFFS45	RK73H1JLTD3921F	59124
R084	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R085	Not Used	-	NOT USED	37338
R086	Not Used	-	NOT USED	37338
R087	Not Used	-	NOT USED	37338
R088	Not Used	-	NOT USED	37338
R089	Resistor,SMT,MF,100ohms,1%,1/10W,0603	RFFS26	RK73H1JLTD1000F	59124
R090	Not Used	-	NOT USED	37338
R091	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R092	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R093	Not Used	-	NOT USED	37338
R094	Resistor,SMT,MF,100Kohms,1%,1/10W,0603	RFFS62	RK73H1JLTD1003F	59124
R095	Not Used	-	NOT USED	37338
R096	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R097	Resistor, SMT, MF, 3320 Ohms,1% 1/4W	RAD31	RK73H2BL3321F	59124
R098	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R099	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R100	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R101	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R102	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124

NAPI85/01 Remote Interface PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R103	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R104	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R105	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R106	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R107	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R108	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R109	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R110	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R111	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R112	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R113	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R114	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R115	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R116	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R117	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R118	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R119	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R120	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R121	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R122	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R123	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R124	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R125	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R126	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R127	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R128	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R129	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R130	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R131	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R132	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R133	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R134	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R135	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R136	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R137	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R138	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R139	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R140	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R141	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124

NAPI85/01 Remote Interface PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R142	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R143	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R144	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R145	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R146	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R147	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R148	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R149	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R150	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R151	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R152	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R153	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R154	Resistor, SMT, MF, 221 Ohms,1% 1/4W	RAD17	RK73H2BL2210F	59124
R155	Resistor, SMT, MF, 221 Ohms,1% 1/4W	RAD17	RK73H2BL2210F	59124
R156	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R157	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R158	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R159	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R160	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R161	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R162	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R163	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R164	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R165	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R166	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R167	Not Used	-	NOT USED	37338
R168	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R169	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R170	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R171	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R172	Resistor, Film, 2200 Ohms, 2PC 1/2W	RC41	RL20S222G	35005
R173	Not Used	-	NOT USED	37338
R174	Not Used	-	NOT USED	37338
R175	Not Used	-	NOT USED	37338
R176	Not Used	-	NOT USED	37338
R177	Resistor,SMT,MF,10.0Kohms,1%,1/10W,0603	RFFS50	RK73H1JLTD1002F	59124
R178	Not Used	-	NOT USED	37338
R179	Not Used	-	NOT USED	37338
R180	Not Used	-	NOT USED	37338

NAPI85/01 Remote Interface PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R181	Not Used	-	NOT USED	37338
R182	Not Used	-	NOT USED	37338
R183	Not Used	-	NOT USED	37338
R184	Resistor,SMT,MF,4750ohms,1%,1/10W,0603	RFFS46	RK73H1JLTD4751F	59124
R185	Not Used	-	NOT USED	37338
R186	Not Used	-	NOT USED	37338
R187	Not Used	-	NOT USED	37338
R188	Not Used	-	NOT USED	37338
R189	Not Used	-	NOT USED	37338
R190	Not Used	-	NOT USED	37338
R191	Not Used	-	NOT USED	37338
R192	Not Used	-	NOT USED	37338
R193	Not Used	-	NOT USED	37338
R194	Not Used	-	NOT USED	37338
R195	Not Used	-	NOT USED	37338
R196	Not Used	-	NOT USED	37338
R197	Not Used	-	NOT USED	37338
R198	Not Used	-	NOT USED	37338
R199	Resistor, MF, 182 Ohms, 1PC 1/4W	RAB16	MF1/4DL1820F	59124
R200	Resistor, MF, 100 Ohms, 1PC 1/4W	RAB13	MF1/4DL1000F	59124
R201	Resistor, MF, 121 Ohms, 1%, 1/4W	RAB14	MF1/4DL1210F	59124
R202	Resistor, MF, 22.1 Ohms, 1PC 1/4W	RAB05	MF1/4DL22R1F	59124
R203	Resistor, MF, 39.2 Ohms, 1PC 1/4W	RAB08	MF1/4DL39R2F	59124
R204	Resistor, MF, 33.2 Ohms, 1PC 1/4W	RAB07	MF1/4DL33R2F	59124
R205	Resistor, MF, 22.1 Ohms, 1PC 1/4W	RAB05	MF1/4DL22R1F	59124
R206	Resistor,SMT,MF,15.0ohms,1%,1/10W,0603	RFFS16	RK73H1JLTD15R0F	59124
R207	Resistor,SMT,MF,12.1ohms,1%,1/10W,0603	RFFS15	RK73H1JLTD12R1F	59124
R208	Resistor,SMT,MF,6.81ohms,1%,1/10W,0603	RFFS12	RK73H1JLTD6R81F	59124
R209	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R210	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R211	Resistor,SMT,MF,10.0ohms,1%,1/10W,0603	RFFS14	RK73H1JLTD10R0F	59124
R212	Resistor,SMT,MF,5.62ohms,1%,1/10W,0603	RFFS11	RK73H1JLTD5R62F	59124
R213	Resistor,SMT,MF,5.62ohms,1%,1/10W,0603	RFFS11	RK73H1JLTD5R62F	59124
R214	Resistor, MF, 56.2 Ohms, 1PC 1/4W	RAB10	MF1/4DL56R2F	59124
RT01	Thermistor, PTC, .15-.25 Ohms, 1.1A Hold	RT17	RXE110	06090
RT02	Thermistor, PTC, .15-.25 Ohms, 1.1A Hold	RT17	RXE110	06090
S01	Switch, DIP, 2-way, 1PST	SC33	76SB02T (ROHS)	81073
T01	Not Used	-	NOT USED	37338
T02	Transformer Assy	196-3081	196-3081	37338

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NAPI85/01 Remote Interface PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
TB01	Terminal Block,5mm,3-pos,PWBMt,Angled,Blue	JR49	796688-3	5Y407
TB02	Terminal Block,5mm,3-pos,PWBMt,Angled,Blue	JR49	796688-3	5Y407
TB03	Not Used	-	NOT USED	37338
TB04	Terminal Block,5mm,3-pos,PWBMt,Angled,Blue	JR49	796688-3	5Y407
U01	Not Used	-	NOT USED	37338
U02	IC,SMT,Instrumentation Amp,SOIC-8	UP98	AD620AR(STATIC)	45496
U03	Not Used	-	NOT USED	37338
U04	IC,SMT,Opamp,Quad,Single Supply,SOIC-14	ULAS01	MC33074AD(STATIC)	04713
U05	IC,SMT,Instrumentation Amp,SOIC-8	UP98	AD620AR(STATIC)	45496
U06	Not Used	-	NOT USED	37338
U07	Not Used	-	NOT USED	37338
U08	Not Used	-	NOT USED	37338
U09	IC,SMT,Opamp,Quad,Single Supply,SOIC-14	ULAS01	MC33074AD(STATIC)	04713
U10	Not Used	-	NOT USED	37338
U11	IC,SMT,Comparator,Quad,SOIC-14	ULCS01	MC3302D(STATIC)	04713
U12	IC,SMT,Comparator,Quad,SOIC-14	ULCS01	MC3302D(STATIC)	04713
U13	IC,SMT,Trans Array, 7 Darl.,SOIC-16	UDAS01	MC1413BD(STATIC)	04713
U14	IC,SMT,Dual Optocoupler,SOIC-8	UDOS01	MOCD223-M(STATIC)	7D893
U15	IC,SMT,Trans Array, 7 Darl.,SOIC-16	UDAS01	MC1413BD(STATIC)	04713
U16	IC,SMT,Trans Array, 7 Darl.,SOIC-16	UDAS01	MC1413BD(STATIC)	04713
U17	IC,SMT,Trans Array, 7 Darl.,SOIC-16	UDAS01	MC1413BD(STATIC)	04713
U18	IC,SMT,CMOS,8-Bit Shft Reg,Par O/P, SOIC-16	UDLS05	MC74HC595AD(STATIC)	04713
U19	IC,SMT,CMOS,8-Bit Shft Reg,Par O/P, SOIC-16	UDLS05	MC74HC595AD(STATIC)	04713
U20	IC,SMT,CMOS,8-Bit Shft Reg,Par O/P, SOIC-16	UDLS05	MC74HC595AD(STATIC)	04713
U21	IC,SMT,Dual Optocoupler,SOIC-8	UDOS01	MOCD223-M(STATIC)	7D893
U22	IC,SMT,Dual Optocoupler,SOIC-8	UDOS01	MOCD223-M(STATIC)	7D893
U23	IC,SMT,Dual Optocoupler,SOIC-8	UDOS01	MOCD223-M(STATIC)	7D893
U24	IC,SMT,Dual Optocoupler,SOIC-8	UDOS01	MOCD223-M(STATIC)	7D893
U25	IC,SMT,CMOS,8-Bit Shft Reg,Par I/P, SOIC-16	UDLS04	MC74HC165AD(STATIC)	04713
U26	IC,SMT,RS-485 Transceiver,Sgl,SOIC-8	UDTS03	DS36C278TM(STATIC)	27014
U27	IC,SMT,Microprocessor Supervisor, SC70	UDSS02	ADM803-MAKS(STATIC)	24355
U28	IC,SMT,Dual Optocoupler,SOIC-8	UDOS01	MOCD223-M(STATIC)	7D893
U29	IC,SMT,Dual Optocoupler,SOIC-8	UDOS01	MOCD223-M(STATIC)	7D893
U30	IC,SMT,Dual Optocoupler,SOIC-8	UDOS01	MOCD223-M(STATIC)	7D893
U31	IC, SMT, Micro, ADC, PWM,Flash, TQFP-32	UDMS03	ATMEGA8-16AI(STATIC)	1FN41

NAPI85/01 Remote Interface PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
U32	IC,SMT,CMOS,8-Bit Shft Reg,Par I/P, SOIC-16	UDLS04	MC74HC165AD(STATIC)	04713
U33	IC,SMT,CMOS,Quad Tri-State Buffer, SOIC-14	UDLS06	MC74HC125AD(STATIC)	04713
U34	Not Used	-	NOT USED	37338
U35	Not Used	-	NOT USED	37338
U36	Not Used	-	NOT USED	37338
U37	Not Used	-	NOT USED	37338
U38	Not Used	-	NOT USED	37338
U39	IC,SMT,CMOS,8-Bit Shft Reg,Par O/P, SOIC-16	UDLS05	MC74HC595AD(STATIC)	04713
U40	IC,SMT,Trans Array, 7 Darl.,SOIC-16	UDAS01	MC1413BD(STATIC)	04713
XE01	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE02	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE03	Not Used	-	NOT USED	37338
XE04	Not Used	-	NOT USED	37338
XE05	Not Used	-	NOT USED	37338
XE06	Not Used	-	NOT USED	37338
XE07	Conn, Header,Square Post,Gold,Dual,40-pin	JF47	4-102973-0	09482
XE08	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE09	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE10	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE11	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE12	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE13	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE14	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE15	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE16	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE17	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE18	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE19	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE20	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE21	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE22	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE23	Not Used	-	NOT USED	37338
XE24	Not Used	-	NOT USED	37338
XE25	Not Used	-	NOT USED	37338
XE26	Not Used	-	NOT USED	37338
XE27	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
XE28	Not Used	-	NOT USED	37338
XE29	Not Used	-	NOT USED	37338

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REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
XE30	Conn, Header, SIP,12 Pin Breakawy,.10 Ctr	JQ16	1-103185-2	09482
Y01	Crystal,SMT,Fund,Par Res,3.6864MHz,Comm	XFPS03	ATSM49-3.6864MHz	23875

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Not Used	-	NOT USED	37338
C02	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C03	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C04	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C05	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C06	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C07	Not Used	-	NOT USED	37338
C08	Not Used	-	NOT USED	37338
C09	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C10	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C11	Not Used	-	NOT USED	37338
C12	Not Used	-	NOT USED	37338
C13	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C14	Not Used	-	NOT USED	37338
C15	Not Used	-	NOT USED	37338
C16	Not Used	-	NOT USED	37338
C17	Not Used	-	NOT USED	37338
C18	Capacitor, Ceramic, 0.0022uF 10% 100V	CCG02	CKR05BX222KRV	56289
C19	Not Used	-	NOT USED	37338
C20	Not Used	-	NOT USED	37338
C21	Capacitor, Ceramic, 0.0022uF 10% 100V	CCG02	CKR05BX222KRV	56289
C22	Not Used	-	NOT USED	37338
CR01	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR02	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR03	Not Used	-	NOT USED	37338
CR04	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR05	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR06	Diode, Schottky, 1A 40V	QS13	1N5819(STATIC) MOTO	04713
CR07	Diode, Schottky, 1A 40V	QS13	1N5819(STATIC) MOTO	04713
J01	Conn, Plug, D-Sub, 25 pin, PWB Mt	JS12	K22-B25P-NJ	63590
J02	Conn, Plug, D-Sub, 25 pin, PWB Mt	JS12	K22-B25P-NJ	63590
J03	Conn, Socket, D-Sub, 25 pin, PWB Mt	JS13	K22-B25S-NJ	22421
J04	Conn, Socket, D-Sub, 25 pin, PWB Mt	JS13	K22-B25S-NJ	22421
J05	Conn, Header, Ribbon Cbl, 40 pin	JP52	499910-9	00779
J06	Conn, Header, Ribbon Cbl, 20 pin	JP46	499910-4	00779
J07	Conn, Header, Ribbon Cbl, 40 pin	JP52	499910-9	00779

NAPI87/01 Exciter Interface PWB Assy,J1000

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
J08	Conn, Plug, D-Sub, 15 pin, PWB Mt	JS18	K22-A15P-NJ	63590
J09	Conn, Plug, D-Sub, 15 pin, PWB Mt	JS18	K22-A15P-NJ	63590
J10	Conn, Header, Ribbon Cbl, 40 pin	JP52	499910-9	00779
J11	Conn, Coax, Recept, 20 Deg.Low Profile	JT43	TMP-S01X-B1	TAIKO
J12	Conn, Coax, Recept, 20 Deg.Low Profile	JT43	TMP-S01X-B1	TAIKO
J13	Conn, Coax, Recept, 20 Deg.Low Profile	JT43	TMP-S01X-B1	TAIKO
J14	Conn, Coax, Recept, 20 Deg.Low Profile	JT43	TMP-S01X-B1	TAIKO
K01	Relay, 24Vdc, 4PDT, PWB Mount	KC11	DS4E-M-DC24V	61529
K02	Relay, 24Vdc Coil, 4PDT, 5A	KC14	MY4-DC24	34361
L01	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L02	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L03	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L04	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
Q01	Not Used	-	NOT USED	37338
Q02	Transistor, FET, N Channel	QN54	2N7000(STATIC)	04713
Q03	Transistor, NPN, General Purpose	QAP04	2N2219A	04713
Q04	Transistor, PNP, TO-220, 100V	QS18	TIP32C	04713
Q05	Not Used	-	NOT USED	37338
Q06	Not Used	-	NOT USED	37338
Q07	Transistor, NPN, Switch/Amplifier	QA45	2N4401	04713
Q08	Not Used	-	NOT USED	37338
R01	Resistor, MF, 121K Ohms, 1PC 1/4W	RAC02	MF1/4DL1213F	59124
R02	Resistor, MF, 100K Ohms, 1PC 1/4W	RAC01	MF1/4DL1003F	59124
R03	Resistor, MF, 1.21K Ohms, 1PC1/4W	RAB26	MF1/4DL1211F	59124
R04	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R05	Not Used	-	NOT USED	37338
R06	Not Used	-	NOT USED	37338
R07	Not Used	-	NOT USED	37338
R08	Not Used	-	NOT USED	37338
R09	Not Used	-	NOT USED	37338
R10	Not Used	-	NOT USED	37338
R11	Not Used	-	NOT USED	37338
R12	Not Used	-	NOT USED	37338
R13	Resistor, MF, 121K Ohms, 1PC 1/4W	RAC02	MF1/4DL1213F	59124
R14	Not Used	-	NOT USED	37338
R15	Not Used	-	NOT USED	37338
R16	Resistor, MF, 33.2K Ohms, 1PC1/4W	RAB43	MF1/4DL3322F	59124
R17	Not Used	-	NOT USED	37338
R18	Resistor, MF, 39.2K Ohms, 1PC1/4W	RAB44	MF1/4DL3922F	59124

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NAPI87/01 Exciter Interface PWB Assy,J1000

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R19	Resistor, MF, 56.2K Ohms, 1PC1/4W	RAB46	MF1/4DL5622F	59124
R20	Not Used	-	NOT USED	37338
R21	Resistor, MF, 22.1K Ohms, 1PC1/4W	RAB41	MF1/4DL2212F	59124
R22	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R23	Not Used	-	NOT USED	37338
R24	Not Used	-	NOT USED	37338
R25	Resistor, MF, 3.32K Ohms, 1PC1/4W	RAB31	MF1/4DL3321F	59124
R26	Not Used	-	NOT USED	37338
R27	Not Used	-	NOT USED	37338
R28	Not Used	-	NOT USED	37338
R29	Not Used	-	NOT USED	37338
R30	Resistor, MF, 3.32K Ohms, 1PC1/4W	RAB31	MF1/4DL3321F	59124
R31	Resistor, MF, 10K Ohms, 0.1%,1/4W	RAC28	MF1/4EL1002F	59124
R32	Not Used	-	NOT USED	37338
R33	Not Used	-	NOT USED	37338
R34	Not Used	-	NOT USED	37338
R35	Resistor, MF, 100K Ohms, 1PC 1/4W	RAC01	MF1/4DL1003F	59124
R36	Resistor, MF, 39.2K Ohms, 1PC1/4W	RAB44	MF1/4DL3922F	59124
R37	Resistor, MF, 56.2K Ohms, 1PC1/4W	RAB46	MF1/4DL5622F	59124
R38	Resistor, MF, 22.1K Ohms, 1PC1/4W	RAB41	MF1/4DL2212F	59124
R39	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R40	Not Used	-	NOT USED	37338
U01	IC, CMOS, Hex Schmitt Trigger	UM23	MC14584BCP(STATIC)	04713
U02	Not Used	-	NOT USED	37338
U03	Not Used	-	NOT USED	37338
XK01	Not Used	-	NOT USED	37338
XK02	Relay Socket, 1310 Series, PWB Mount	KC19	1310H-2PC	73949
XQ01	PWB, Pad, Transistor, Mtg,T018 to T05	HAD24	7717-149N NATURAL	13103
XQ02	PWB, Pad, Transistor, Mtg,T018 to T05	HAD24	7717-149N NATURAL	13103
XQ03	PWB, Pad, Transistor, Mtg,T018 to T05	HAD24	7717-149N NATURAL	13103
XQ04	PWB, Pad, Transistor, Mtg,T018 to T05	HAD24	7717-149N NATURAL	13103
XQ05	PWB, Pad, Transistor, Mtg,T018 to T05	HAD24	7717-149N NATURAL	13103
XQ06	PWB, Pad, Transistor, Mtg,T018 to T05	HAD24	7717-149N NATURAL	13103

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C02	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C03	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C04	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C08	Capacitor, Ceramic, 0.0047uF10% 100V	CCG03	CKR05BX472KRV	56289
C09	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C10	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C11	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C12	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C14	Capacitor, Mica, Dipped, 100pF 2% 500V	CB25	CM05FD101G03	SOSH
C15	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C16	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C17	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C18	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C21	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C22	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C23	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C25	Capacitor, Mica, Dipped, 100pF 2% 500V	CB25	CM05FD101G03	SOSH
C26	Capacitor, Ceramic, 0.047uF 10% 100V	CCG06	CKR06BX473KRV	56289
C27	Capacitor, Mica, Dipped, 330pF 2% 500V	CB31	CM05FD331G03	14655
C28	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C29	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C31	Capacitor, Ceramic, 0.0047uF10% 100V	CCG03	CKR05BX472KRV	56289
C33	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C34	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C35	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C36	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C37	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C38	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C39	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C40	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C41	Capacitor, Ceramic, 0.22uF 10% 50V	CCG08	CKR06BX224KRV	56289
C42	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C43	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095

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REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C44	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C45	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C46	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C47	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C48	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C49	Capacitor, Mica, Dipped, 100pF 2% 500V	CB25	CM05FD101G03	SOSH
C50	Capacitor, Mica, Dipped, 100pF 2% 500V	CB25	CM05FD101G03	SOSH
C51	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C52	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C53	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C54	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C55	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C56	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C57	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C58	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C59	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C60	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C61	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C62	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C63	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C64	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
C65	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C66	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C67	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C68	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C69	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C70	Not Used	-	NOT USED	37338
CR01	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR02	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR03	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR04	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR05	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
J01	Conn, Plug, D-Sub, 25 pin, PWB Mt	JS12	K22-B25P-NJ	63590
K01	Relay, 5V Coil, 2PDT, 1A	KC18	TQ2-5V	61529

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REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
L01	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L02	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L04	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L06	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L08	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
Q01	Transistor, NPN, Switch/Amplifier	QA45	2N4401	04713
Q02	Transistor, NPN, Switch/Amplifier	QA45	2N4401	04713
Q03	Transistor, NPN, Switch/Amplifier	QA45	2N4401	04713
Q04	Transistor, NPN, Switch/Amplifier	QA45	2N4401	04713
Q05	Transistor, PNP, Switch/Amplifier	QA44	2N4403	04713
Q06	Transistor, NPN, Switch/Amplifier	QA45	2N4401	04713
Q07	Transistor, PNP, Switch/Amplifier	QA44	2N4403	04713
Q10	Transistor, NPN, Switch/Amplifier	QA45	2N4401	04713
R01	Resistor, MF, 100K Ohms, 1PC 1/4W	RAC01	MF1/4DL1003F	59124
R02	Not Used	-	NOT USED	37338
R03	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R04	Resistor, MF, 681K Ohms, 1%1/4W	RAC11	MF1/4DL6813F	59124
R05	Resistor, MF, 562 Ohms, 1PC 1/4W	RAB22	MF1/4DL5620F	59124
R06	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R07	Resistor, MF, 100K Ohms, 1PC 1/4W	RAC01	MF1/4DL1003F	59124
R08	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R09	Not Used	-	NOT USED	37338
R10	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R11	Resistor, MF, 2.21M Ohms, 1%1/4W	RAC17	MF1/4DL2214F	59124
R12	Resistor, MF, 22.1K Ohms, 1PC1/4W	RAB41	MF1/4DL2212F	59124
R13	Resistor, MF, 47.5K Ohms, 1PC1/4W	RAB45	MF1/4DL4752F	59124
R14	Resistor, MF, 681K Ohms, 1%1/4W	RAC11	MF1/4DL6813F	59124
R16	Resistor, MF, 100K Ohms, 1PC 1/4W	RAC01	MF1/4DL1003F	59124
R18	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R20	Resistor, MF, 47.5K Ohms, 1PC1/4W	RAB45	MF1/4DL4752F	59124
R22	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R23	Resistor, MF, 100K Ohms, 1PC 1/4W	RAC01	MF1/4DL1003F	59124
R25	Resistor, MF, 1.21K Ohms, 1PC1/4W	RAB26	MF1/4DL1211F	59124
R26	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R27	Resistor, MF, 18.2K Ohms, 1PC1/4W	RAB40	MF1/4DL1822F	59124
R29	Resistor, MF, 2.21M Ohms, 1%1/4W	RAC17	MF1/4DL2214F	59124
R30	Resistor, MF, 2.21M Ohms, 1%1/4W	RAC17	MF1/4DL2214F	59124
R31	Resistor, Variable, Film, 5000 Ohms, 1/2W	RV10	3339P-1-502	80294
R33	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R34	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R35	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R36	Resistor, MF, 100K Ohms, 1PC 1/4W	RAC01	MF1/4DL1003F	59124
R37	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R38	Resistor, MF, 10K Ohms, 0.1%,1/4W	RAC28	MF1/4EL1002F	59124
R39	Resistor, MF, 10K Ohms, 0.1%,1/4W	RAC28	MF1/4EL1002F	59124
R42	Resistor, MF, 10K Ohms, 0.1%,1/4W	RAC28	MF1/4EL1002F	59124
R44	Resistor, MF, 10K Ohms, 0.1%,1/4W	RAC28	MF1/4EL1002F	59124
R46	Resistor, MF, 10K Ohms, 0.1%,1/4W	RAC28	MF1/4EL1002F	59124
R47	Resistor, MF, 4990 Ohms, 1%1/4W	RAC32	MF1/4DL4991F	59124
R48	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R49	Resistor, MF, 10K Ohms, 0.1%,1/4W	RAC28	MF1/4EL1002F	59124
R50	Resistor, MF, 562 Ohms, 1PC 1/4W	RAB22	MF1/4DL5620F	59124
R51	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R52	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R53	Resistor, MF, 562 Ohms, 1PC 1/4W	RAB22	MF1/4DL5620F	59124
R54	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R55	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R56	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R57	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R58	Resistor, MF, 15.0K Ohms, 1PC1/4W	RAB39	MF1/4DL1502F	59124
R59	Resistor, Variable, Film, 1000 Ohms, 1/2W	RV06	3339P-1-102	80294
R60	Resistor, MF, 1.21K Ohms, 1PC1/4W	RAB26	MF1/4DL1211F	59124
R61	Resistor, MF, 1.21K Ohms, 1PC1/4W	RAB26	MF1/4DL1211F	59124
R62	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R63	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R65	Resistor, MF, 56.2K Ohms, 1PC1/4W	RAB46	MF1/4DL5622F	59124
R66	Resistor, MF, 56.2K Ohms, 1PC1/4W	RAB46	MF1/4DL5622F	59124
R67	Resistor, MF, 1.00M Ohms, 1%1/4W	RAC13	MF1/4DL1004F	59124
R68	Resistor, MF, 1.00M Ohms, 1%1/4W	RAC13	MF1/4DL1004F	59124
R69	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R70	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R71	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R72	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R73	Resistor, MF, 1.50K Ohms, 1PC1/4W	RAB27	MF1/4DL1501F	59124
R74	Resistor, MF, 10.0 Ohms, 1PC 1/4W	RAB01	MF55D10R0F	59124
R75	Resistor, MF, 10.0 Ohms, 1PC 1/4W	RAB01	MF55D10R0F	59124
R76	Resistor, MF, 10.0 Ohms, 1PC 1/4W	RAB01	MF55D10R0F	59124
R77	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124

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NAPM10A/01 Interphase PDM Driver

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R78	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R80	Resistor, MF, 33.2K Ohms, 1PC1/4W	RAB43	MF1/4DL3322F	59124
U01	IC, CMOS, Dual, Type D, Flip-Flop	UX13	MC74HC74N(STATIC)	04713
U02	IC, Op Amp, Quad, Single Supply	UR42	MC34074AP(STATIC)	04713
U03	IC, Op Amp, Quad, Single Supply	UR42	MC34074AP(STATIC)	04713
U04	IC, Voltage Regulator, +5V, 1A, Plastic	UX17	MC7805ACT	04713
U05	IC, Comparator, Dual, High Speed	UD07	LM319J(STATIC)	27014
U06	IC, Analog Multiplier	UN12	RC4200AN(STATIC)	07263
U07	IC, Op Amp, Dual	UN25	TL072CP(STATIC)	04713
U08	IC, Op Amp, Dual	UN25	TL072CP(STATIC)	04713
U09	IC, CMOS, Quad, 2-input NAND GAte	UM15	MC74HC00N(STATIC)	04713
U10	IC, Comparator, Dual, High Speed	UD07	LM319J(STATIC)	27014
U11	IC, Comparator, Dual, High Speed	UD07	LM319J(STATIC)	27014
U12	IC, Comparator, Quad	UL02	MC3302L(STATIC)	04713
U13	IC, Op Amp, Dual, Single Supply	UM26	MC33072AU (STATIC) MOTO	04713

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Capacitor, Elect, 1000uF 50V	CT41	SME50VB102M16X25 LL	1W344
C02	Capacitor, Elect, 1000uF 50V	CT41	SME50VB102M16X25 LL	1W344
C03	Capacitor, Elect, 1000uF 50V	CT41	SME50VB102M16X25 LL	1W344
C04	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C05	Capacitor, Elect, 100uF 20% 25V	CAP42	KME25VB101M6X11L L	1W344
C06	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C07	Capacitor, Elect, 1000uF 50V	CT41	SME50VB102M16X25 LL	1W344
C08	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C09	Capacitor, Elect, 1000uF 50V	CT41	SME50VB102M16X25 LL	1W344
C10	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C11	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C12	Capacitor, Elect, 1000uF 50V	CT41	SME50VB102M16X25 LL	1W344
C13	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C14	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C15	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C16	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C17	Not Used	-	NOT USED	37338
C18	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C19	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C20	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C21	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C22	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C23	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C24	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C25	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C26	Capacitor, Tantalum, Dipped, 10uF, 35V	CCP36	T351G106K035AT(RoHS) KEMET	96095
CR01	Diode, Pwr Rectifier, 200V,15A, Ultrafast	QM42	MUR1520(STATIC)	ONSEMI
CR02	Diode, Power Rectifier, 200V 1A	QN38	MUR120	04713
CR03	Diode, Pwr Rectifier, 200V,15A, Ultrafast	QM42	MUR1520(STATIC)	ONSEMI
CR04	Diode, Power Rectifier, 200V 1A	QN38	MUR120	04713
CR05	Diode, Pwr Rectifier, 200V,15A, Ultrafast	QM42	MUR1520(STATIC)	ONSEMI
CR06	Diode, Power Rectifier, 200V 1A	QN38	MUR120	04713
CR07	Diode, Schottky Rectifier, 45V, 16A	QM43	MBR1645(STATIC)	ONSEMI
CR08	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR09	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263

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NAPS28A LVPS Buck Converter PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
CR10	Diode, Power Rectifier, 200V 1A	QN38	MUR120	04713
CR11	Diode, Schottky Rectifier, 45V, 16A	QM43	MBR1645(STATIC)	ONSEMI
CR12	Diode, Zener, 6.2V, 1.5W, 2%	QN22	1N5920C(STATIC)	04713
CR13	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR14	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR15	Diode, Zener, 4.7V, 500mW, 1%	QN19	1N5992D	04713
CR16	Diode, Zener, 4.7V, 500mW, 1%	QN19	1N5992D	04713
CR17	Diode, Zener, 18V, 1W, 5%	QN03	1N4746A	07263
CR18	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
E01	Connector, Quick-Dis, M,1/4 Tab, PWB	HR26	1287	91833
E02	Connector, Quick-Dis, M,1/4 Tab, PWB	HR26	1287	91833
J01	Conn, Header, Ribbon Cbl, 40 pin	JP52	499910-9	00779
J02	Conn, Header, Ribbon Cbl, 40 pin	JP52	499910-9	00779
J03	MTA, Square Post Header Assy,4 pin	JU20	640383-4	09482
L01	Coupled Inductor Assembly	197-7030-01	197-7030-01	37338
L02	Coupled Inductor Assembly	197-7030-01	197-7030-01	37338
Q01	IC, Inverting Switching Regulator, 5A	UD57	MC33167T(STATIC)	04713
Q02	IC, Inverting Switching Regulator, 5A	UD57	MC33167T(STATIC)	04713
R01	Resistor, MF, 6.81K Ohms, 1PC1/4W	RAB35	MF1/4DL6811F	59124
R02	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R03	Resistor, MF, 2.21K Ohms, 1PC1/4W	RAB29	MF1/4DL2211F	59124
R04	Resistor, MF, 68.1K Ohms, 1PC1/4W	RAB47	MF1/4DL6812F	59124
R05	Resistor, MF, 22.1K Ohms, 1PC1/4W	RAB41	MF1/4DL2212F	59124
R06	Resistor, MF, 2.21K Ohms, 1PC1/4W	RAB29	MF1/4DL2211F	59124
R07	Resistor, MF, 6.81K Ohms, 1PC1/4W	RAB35	MF1/4DL6811F	59124
R08	Resistor, MF, 68.1K Ohms, 1PC1/4W	RAB47	MF1/4DL6812F	59124
R09	Resistor, MF, 18.2K Ohms, 1PC1/4W	RAB40	MF1/4DL1822F	59124
R10	Resistor, MF, 27.4K Ohms, 1PC1/4W	RAB42	MF1/4DL2742F	59124
R11	Resistor, MF, 15.0K Ohms, 1PC1/4W	RAB39	MF1/4DL1502F	59124
R12	Resistor, MF, 39.2K Ohms, 1PC1/4W	RAB44	MF1/4DL3922F	59124
R13	Resistor, MF, 12.1K Ohms, 1PC1/4W	RAB38	MF1/4DL1212F	59124
R14	Resistor, MF, 39.2K Ohms, 1PC1/4W	RAB44	MF1/4DL3922F	59124
R15	Resistor, MF, 18.2K Ohms, 1PC1/4W	RAB40	MF1/4DL1822F	59124
R16	Resistor, MF, 56.2K Ohms, 1PC1/4W	RAB46	MF1/4DL5622F	59124
R17	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R18	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R19	Resistor, MF, 3.32K Ohms, 1PC1/4W	RAB31	MF1/4DL3321F	59124
R20	Resistor, MF, 332 Ohms, 1PC 1/4W	RAB19	MF1/4DL3320F	59124
R21	Resistor, Film, 1000 Ohms, 2PC 1/2W	RAP09	RL20S102G	35005

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NAPS28A LVPS Buck Converter PWB Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R22	Resistor, MF, 8.25K Ohms, 1PC1/4W	RAB36	MF1/4DL8251F	59124
R23	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R24	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R25	Resistor, Film, 5600 Ohms, 2%1/2W	RAP12	RL20S562G	35005
R26	Not Used	-	NOT USED	37338
R27	Resistor, Film, 1000 Ohms, 2PC 1/2W	RAP09	RL20S102G	35005
R28	Resistor, Film, 1000 Ohms, 2PC 1/2W	RAP09	RL20S102G	35005
R29	Resistor, Film, 1000 Ohms, 2PC 1/2W	RAP09	RL20S102G	35005
RT01	Thermistor, PTC, .05-.08 Ohms, 2.5A Hold	RT19	RXE250	4G927
RT02	Not Used	-	NOT USED	37338
RT03	Thermistor, PTC, .05-.08 Ohms, 2.5A Hold	RT19	RXE250	4G927
RT04	Thermistor, PTC, .15-.25 Ohms, 1.1A Hold	RT17	RXE110	06090
T01	Signal Transformer, 1.1VA230V/36V	TD46	DST-2-36	08779
U01	IC, Comparator, Dual	UT11	LM393N(STATIC)	27014
U02	Optocoupler/Optoisolator, 6-Pin DIP	UM53	MOC8104(STATIC)	QT

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C02	Capacitor, Ceramic, 1.0uF 100V	CAP16	RPE114Z5U105M100 V	91929
C03	Not Used	-	NOT USED	37338
C04	Capacitor, Polyprop, 0.015uF 800V	CT39	715P1535800L	SB ELE
C05	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C06	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C07	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C08	Capacitor, Ceramic, Coated, 2.2uF 20% 50V	CCG45	C340C225M5R5CA	91929
C09	Capacitor, Ceramic, Y, 0.01uF250VAC	CCG44	DE1607F103M-KH	MURATA
C10	Capacitor, Ceramic, 1.0uF 100V	CAP16	RPE114Z5U105M100 V	91929
C11	Capacitor, Ceramic, Y, 0.01uF250VAC	CCG44	DE1607F103M-KH	MURATA
C12	Capacitor, Electrolytic, 470uF450V	CBP15	381LR471M450A052 CORNELL	14655
C13	Capacitor, Electrolytic, 470uF450V	CBP15	381LR471M450A052 CORNELL	14655
C14	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C15	Capacitor, Electrolytic, 470uF450V	CBP15	381LR471M450A052 CORNELL	14655
C16	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C17	Capacitor, Metal,Polyprop, 5uF +/-20% 600V	CT40	734G505X0600	DEARBO
C18	Capacitor, Ceramic, 1.0uF 100V	CAP16	RPE114Z5U105M100 V	91929
C19	Capacitor, Mica, Dipped, 470pF 2% 500V	CB33	CD15FD471G03	14655
C20	Capacitor, Dipped Mica, 220pF5% 1000V	CT16	CDV18FF221J03	14655
C21	Capacitor, Dipped Mica, 220pF5% 1000V	CT16	CDV18FF221J03	14655
C22	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C23	Capacitor, Dipped Mica, 220pF5% 1000V	CT16	CDV18FF221J03	14655
C24	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C25	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C26	Capacitor, Mica, Dipped, 1000pF 2% 500V	CB37	CM06FD102G03	14655
C27	Capacitor, Metal,Polyprop, 5uF +/-20% 600V	CT40	734G505X0600	DEARBO
C28	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C29	Capacitor, Ceramic, 1.0uF 100V	CAP16	RPE114Z5U105M100 V	91929
C30	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C31	Capacitor, Ceramic, 2700pF, 1%, 100V	CAP47	C052C272F1G5CA	91929
C32	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C33	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C34	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929

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NAPS31A/00 SMPS, Fwd Converter PWBAssy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C35	Capacitor, Mica, Dipped, 100pF 2% 500V	CB25	CM05FD101G03	SOSH
C36	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
C37	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C38	Capacitor, Ceramic, 0.001uF 10% 200V	CCG01	CKR05BX102KRV SPRAGUE	91929
C39	Not Used	-	NOT USED	37338
C40	Not Used	-	NOT USED	37338
C41	Capacitor, Ceramic, 0.47uF 10% 50V	CCG09	CKR06BX474KRV	56289
C42	Not Used	-	NOT USED	37338
C43	Capacitor, Metal,Polyprop, 3.3uF, 10%, 250V	CD47	725M33592LA3	SBE
C44	Capacitor, Metal,Polyprop, 3.3uF, 10%, 250V	CD47	725M33592LA3	SBE
C45	Capacitor, Metal,Polyprop, 3.3uF, 10%, 250V	CD47	725M33592LA3	SBE
CR01	Diode, Schottky, 1A 40V	QS13	1N5819(STATIC) MOTO	04713
CR02	Diode, Schottky, 1A 40V	QS13	1N5819(STATIC) MOTO	04713
CR03	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR04	Diode, Zener Transient Supressor, 20V	QI29	P6KE20CA	07263
CR05	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR06	Diode, Rect, 1200V,8 AmpUltrafast, Soft Recovery	QM52	HFA08TB120(STATIC)	IR
CR07	Diode, Rect, 1200V,8 AmpUltrafast, Soft Recovery	QM52	HFA08TB120(STATIC)	IR
CR08	Not Used	-	NOT USED	37338
CR09	Diode, Rect, 1200V,8 AmpUltrafast, Soft Recovery	QM52	HFA08TB120(STATIC)	IR
CR10	Diode, Rect, 1200V,8 AmpUltrafast, Soft Recovery	QM52	HFA08TB120(STATIC)	IR
CR11	Diode, Rect, 1200V,8 AmpUltrafast, Soft Recovery	QM52	HFA08TB120(STATIC)	IR
CR12	Diode, Schottky, 1A 40V	QS13	1N5819(STATIC) MOTO	04713
CR13	Diode, Rect, 1200V,8 AmpUltrafast, Soft Recovery	QM52	HFA08TB120(STATIC)	IR
CR14	Diode, Rect, 1200V,8 AmpUltrafast, Soft Recovery	QM52	HFA08TB120(STATIC)	IR
CR15	Diode, Rect, 1200V,8 AmpUltrafast, Soft Recovery	QM52	HFA08TB120(STATIC)	IR
CR16	Diode, Schottky, 1A 40V	QS13	1N5819(STATIC) MOTO	04713
CR17	Diode, Zener, 5.1V, 1W, 5%	QM07	1N4733A	04713
CR18	Diode, Zener, 16V, 1.5W, 2%	QL23	1N5930C	91929
CR19	Diode, Schottky, 1A 40V	QS13	1N5819(STATIC) MOTO	04713
CR20	Diode, Rect, 1200V,8 AmpUltrafast, Soft Recovery	QM52	HFA08TB120(STATIC)	IR

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NAPS31A/00 SMPS, Fwd Converter PWBAssy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
CR21	Diode, Schottky, 1A 40V	QS13	1N5819(STATIC) MOTO	04713
DS01	Diode, LED, Amber	QK14	HLMP-3451	50434
DS02	Diode, LED, Green	QK12	HLMP-3554	50434
E01	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
E02	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
E03	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
E04	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
E05	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
J01	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
J02	Conn, Pin Header,3-Pin,Mate-N-Lok, Vert	JT65	641966-1	09482
J03	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
L01	Inductor, Choke, 2.5 Turns, JMtl	LA16	82-152-J	33062
L02	Not Used	-	NOT USED	37338
L03	Choke, Common Mode High L, .58mH, 13Amps	TG48	P3224-A	COILCRA
L04	Inductor Assy	197-1105	197-1105	37338
L05	Inductor Assy	197-1105	197-1105	37338
L06	Inductor Assy	197-1105	197-1105	37338
Q01	Transistor, FET, 600V, 44A,TO264	QR54	IXFK44N60	IXYS
Q02	Transistor, FET, 600V, 44A,TO264	QR54	IXFK44N60	IXYS
Q03	Not Used	-	NOT USED	37338
Q04	Transistor, FET, N Channel	QN54	2N7000(STATIC)	04713
Q05	Transistor, FET, N Channel	QN54	2N7000(STATIC)	04713
Q06	Not Used	-	NOT USED	37338
Q07	Transistor, FET, N Channel, 100V, 8A	QR13	IRF520(STATIC)	81483
Q08	Transistor, FET, N Channel	QN54	2N7000(STATIC)	04713
R01	Resistor, Film, 100K Ohms, 5%, 2W	RBP25	GS-3, 100K OHMS	75042
R02	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R03	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R04	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R05	Resistor, MF, 3.32M Ohms, 1%1/4W	RAC19	MF1/4DL3324F	59124
R07	Resistor, Film, 100K Ohms, 5%, 2W	RBP25	GS-3, 100K OHMS	75042
R08	Not Used	-	NOT USED	37338
R09	Resistor, Film, 1M Ohms, 2PC 1/2W	RD31	RL20S105G	14655
R10	Resistor, MF, 22.1K Ohms, 1PC1/4W	RAB41	MF1/4DL2212F	59124
R11	Not Used	-	NOT USED	37338

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NAPS31A/00 SMPS, Fwd Converter PWBAssy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R12	Resistor, MF, 332 Ohms, 1PC 1/4W	RAB19	MF1/4DL3320F	59124
R13	Resistor, Film, 390 Ohms, 5%,2W	RBP33	GS-3, 390 OHMS	75042
R14	Resistor, Film, 390 Ohms, 5%,2W	RBP33	GS-3, 390 OHMS	75042
R15	Resistor, Film, 390 Ohms, 5%,2W	RBP33	GS-3, 390 OHMS	75042
R16	Resistor, Film, 390 Ohms, 5%,2W	RBP33	GS-3, 390 OHMS	75042
R17	Resistor, Film, 390 Ohms, 5%,2W	RBP33	GS-3, 390 OHMS	75042
R18	Resistor, Film, 390 Ohms, 5%,2W	RBP33	GS-3, 390 OHMS	75042
R19	Resistor, Film, 390 Ohms, 5%,2W	RBP33	GS-3, 390 OHMS	75042
R20	Resistor, Film, 390 Ohms, 5%,2W	RBP33	GS-3, 390 OHMS	75042
R21	Resistor, Film, 390 Ohms, 5%,2W	RBP33	GS-3, 390 OHMS	75042
R22	Resistor, MF, 68.1 Ohms, 1PC 1/4W	RAB11	MF1/4DL68R1F	59124
R23	Resistor, MF, 392 Ohms, 1PC 1/4W	RAB20	MF1/4DL3920F	59124
R24	Resistor, MF, 22.1K Ohms, 1PC1/4W	RAB41	MF1/4DL2212F	59124
R25	Resistor, MF, 4.75K Ohms, 1PC1/4W	RAB33	MF1/4DL4751F	59124
R26	Resistor, MF, 15.0K Ohms, 1PC1/4W	RAB39	MF1/4DL1502F	59124
R27	Resistor, MF, 1.82K Ohms, 1PC1/4W	RAB28	MF1/4DL1821F	59124
R28	Resistor, MF, 2.21K Ohms, 1PC1/4W	RAB29	MF1/4DL2211F	59124
R29	Resistor, MF, 681 Ohms, 1PC 1/4W	RAB23	MF1/4DL6810F	59124
R30	Resistor, MF, 6.81K Ohms, 1PC1/4W	RAB35	MF1/4DL6811F	59124
R31	Not Used	-	NOT USED	37338
R32	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R33	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R34	Not Used	-	NOT USED	37338
R35	Resistor, MF, 332 Ohms, 1PC 1/4W	RAB19	MF1/4DL3320F	59124
R36	Not Used	-	NOT USED	37338
R37	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R38	Not Used	-	NOT USED	37338
R39	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R40	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R41	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R42	Not Used	-	NOT USED	37338
R43	Resistor, Wirewound, 33K ohms, 1PC5W	RN13	RS5-33K OHMS-1%	35005
R44	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R45	Not Used	-	NOT USED	37338
R46	Resistor, MF, 182 Ohms, 1PC 1/4W	RAB16	MF1/4DL1820F	59124
R47	Resistor, MF, 825 Ohms, 1PC 1/4W	RAB24	MF1/4DL8250F	59124
R48	Not Used	-	NOT USED	37338
R49	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R50	Resistor, Wirewound, 0.2 ohms, 1%, 3W	RT12	RS-2B	35005

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NAPS31A/00 SMPS, Fwd Converter PWBAssy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R51	Resistor, MF, 10.0 Ohms, 1PC 1/4W	RAB01	MF55D10R0F	59124
R52	Resistor, MF, 39.2 Ohms, 1PC 1/4W	RAB08	MF1/4DL39R2F	59124
R53	Resistor, MF, 1.50K Ohms, 1PC1/4W	RAB27	MF1/4DL1501F	59124
R54	Resistor, MF, 100 Ohms, 1PC 1/4W	RAB13	MF1/4DL1000F	59124
R55	Resistor, MF, 121 Ohms, 1%, 1/4W	RAB14	MF1/4DL1210F	59124
R56	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R57	Resistor, Film, 3.32 Ohms, 1PC 1/2W	RZ04	MF1/2DL3R32F	59124
R58	Resistor, Film, 15 Ohms, 2PC 1/2W	RC15	RL20S150G	35005
R59	Not Used	-	NOT USED	37338
R60	Not Used	-	NOT USED	37338
R61	Resistor, MF, 5.62K Ohms, 1PC1/4W	RAB34	MF1/4DL5621F	59124
R62	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R63	Resistor, MF, 39.2 Ohms, 1PC 1/4W	RAB08	MF1/4DL39R2F	59124
R64	Resistor, MF, 681 Ohms, 1PC 1/4W	RAB23	MF1/4DL6810F	59124
R65	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
R66	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R67	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124
R68	Resistor, MF, 10.0 Ohms, 1PC 1/4W	RAB01	MF55D10R0F	59124
R69	Resistor, MF, 1K Ohms, 1PC 1/4W	RAB25	MF1/4DL1001F	59124
RT01	Thermistor, PTC, .50-.77 Ohms, 0.5A Hold	RT16	RXE050	06090
RV01	Varistor, 300VAC, 173J, Clamp775V	QI46	SIOV-S14K300	EPCOS
RV02	Varistor, 300VAC, 173J, Clamp775V	QI46	SIOV-S14K300	EPCOS
RV03	Varistor, 300VAC, 173J, Clamp775V	QI46	SIOV-S14K300	EPCOS
T01	Transformer, Double Ended,Forward Converter	TA44D	CSM 5521-074 CRAMER	16704
T02	Transformer, Gate Drive, HighFreq	TZ74	P0584	01961
T03	Transformer, Current Sense, High Freq	TZ51	CST306-3A	MAGNE
U01	Diode, Power Rectifier, 1600VDual 2x28A	UR68	DSP25-16A(STATIC)	0A5K5
U02	Diode, Power Rectifier, 1600VDual 2x28A	UR68	DSP25-16A(STATIC)	0A5K5
U03	IC, FET Driver, High Current,8-Pin	UT45	UC3710N(STATIC)	12969
U04	Optocoupler/Optoisolator, 6-Pin DIP	UM53	MOC8104(STATIC)	QT
U05	IC, Op Amp, Quad, Single Supply	UR42	MC34074AP(STATIC)	04713
U06	Optocoupler/Optoisolator, 6-Pin DIP	UM53	MOC8104(STATIC)	QT
U07	Optocoupler/Optoisolator, 6-Pin DIP	UM53	MOC8104(STATIC)	QT
U08	IC, Current Mode PWMController	UR72	UC1844AJ (STATIC)	ER737
U09	Optocoupler/Optoisolator, 6-Pin DIP	UM53	MOC8104(STATIC)	QT
U10	Voltage Regulator, Adj Voltage, 3A	UT36	LM350T	27014
U11	IC,Low Voltage Temp Sensor,+/-3 Deg,TO-92	UC58	TMP36GT9(STATIC)	45496

NAPS31A/03 SMPS, Fwd Conv (JAZZ) PWBAssy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
E01	Conn, Quick-Dis, M,1/4 Tab, PWB,Rt Angle	HX42	1266	91833
E02	Conn, Quick-Dis, M,1/4 Tab, PWB,Rt Angle	HX42	1266	91833
E03	Conn, Quick-Dis, M,1/4 Tab, PWB,Rt Angle	HX42	1266	91833
E04	Not Used	-	NOT USED	37338
E05	Not Used	-	NOT USED	37338
J01	Conn, Header, Ribbon Cbl, Rt Angle,20 pin	JP54	499913-4	00779
J03	Conn, Pin Header, 3-Pin, Mate-N-Lok	JT49	1-350943-0	00779

NARA39A/01 RF Power Assembly

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
A01	RF Power Module	NAP31/02	197-1000-02	37338
A02	RF Power Module	NAP31/02	197-1000-02	37338
A03	RF Filter Input PWB Assy	NAPF03A/01	197-6030-02	37338
A04	RF Power Probe (JAZZ) PWBAssy	NAPF07A/02	195-6020-03	37338
F01	Fuse, 20A, 500Vdc, Non Time Delay, KLM	FA34	KLM-20	71400
F02	Fuse, 20A, 500Vdc, Non Time Delay, KLM	FA34	KLM-20	71400
F03	Fuse, 20A, 500Vdc, Non Time Delay, KLM	FA34	KLM-20	71400
F04	Fuse, 20A, 500Vdc, Non Time Delay, KLM	FA34	KLM-20	71400
J01	Output Connector Assy - Type N	197-8010	197-8010	37338
J02	Conn, Coax, N, Recept, Panel,50ohm	JDP21	UG58A/U	02660
J03	Conn,Recept,AC,250V,20A,Quick-Dis	JT80	83030400(RoHS)	INTERPO
J04	Conn, Pin, Header, 3-PinMate'n Lock	JT64	350767-1	00779
J05	Conn, Pin, Header, 3-PinMate'n Lock	JT64	350767-1	00779
L01	Inductor Assy	197-1092-01	197-1092-01	37338
L02	Inductor Assy	197-6019	197-6019	37338
L03	Inductor Assy	197-6021	197-6021	37338
L04	Inductor Assy	197-1092-01	197-1092-01	37338
P20	Conn, Plug, 3-Pin, Mate-N-Lok	JT50	350766-1	00779
P21	Conn, Plug, 3-Pin, Mate-N-Lok	JT50	350766-1	00779
T01	Combiner Xfmr Assy	197-6015	197-6015	37338
T02	Transformer Assy	197-6016	197-6016	37338
XF01	Fuseholder, 30A, 600V, Type MDA5	BA43	571007	75915
XF02	Fuseholder, 30A, 600V, Type MDA5	BA43	571007	75915
XF03	Fuseholder, 30A, 600V, Type MDA5	BA43	571007	75915
XF04	Fuseholder, 30A, 600V, Type MDA5	BA43	571007	75915

NARA40B Final Assembly, J1000

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
A01	Exciter/Control Assembly	NAE88A/01	197-3000-02	37338
A02	RF Power Assembly	NARA39A/01	197-8050-02	37338

NASM11A/00 Modulator Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C01	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C02	Capacitor, Tantalum, 6.8uF 10PC 35V	CCP19	CSR13F685KM	56289
C03	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C04	Capacitor, Electrolytic, 470uF450V	CBP15	381LR471M450A052 CORNELL	14655
C05	Capacitor, Electrolytic, 470uF450V	CBP15	381LR471M450A052 CORNELL	14655
C06	Capacitor, Electrolytic, 470uF450V	CBP15	381LR471M450A052 CORNELL	14655
C07	Capacitor, Tantalum, 6.8uF 10PC 35V	CCP19	CSR13F685KM	56289
C08	Capacitor, Polyprop, 0.12uF,5%, 600V	CT44	715P12456MA3	SBE
C09	Capacitor, Ceramic, 0.1uF 10%100V	CCG07	CKR06BX104KRV	56289
C10	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
CR01	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR02	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR03	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR04	Diode, General Purpose, 200V,0.1A	QAP29	1N4938	07263
CR05	Diode, Zener, 13V, 1W, 10%	QK19	1N4743	04713
CR06	Diode, Power Rectifier, 4A, Ultra Fast	QM22	MUR460	04713
CR07	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
CR08	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
CR09	Diode, Zener Transient Supressor, 20V	QI29	P6KE20CA	07263
CR10	Diode, Zener Transient Supressor, 20V	QI29	P6KE20CA	07263
CR11	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
CR12	Diode, General Purpose, 400V,1A	QE28	1N4004	04713
CR13	Diode, Zener Transient Supressor, 20V	QI29	P6KE20CA	07263
DS01	Diode, LED, Yellow, 8.6mm Lg	QM19	SSL-LX5093YD	1EM90
E01	Connector, Quick-Dis, M,1/4 Tab, PWB	HR26	1287	91833
E02	Connector, Quick-Dis, M,3/16 Tab PWB	HAM52	1212	91833
J01	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
J02	Conn, Header, Ribbon Cbl, 10 pin	JA49	499910-1	00779
L01	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
Q01	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
Q02	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
R01	Resistor, MF, 33.2 Ohms, 1PC 1/4W	RAB07	MF1/4DL33R2F	59124
R02	Resistor, Film, 68K Ohms, 5%,2W	RBP24	GS-3, 68K OHMS	75042
R03	Resistor, Film, 68K Ohms, 5%,2W	RBP24	GS-3, 68K OHMS	75042

Continued from previous page

NASM11A/00 Modulator Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
R04	Resistor, MF, 10.0 Ohms, 1PC 1/4W	RAB01	MF55D10R0F	59124
R05	Resistor, MF, 1.82K Ohms, 1PC1/4W	RAB28	MF1/4DL1821F	59124
R06	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
R07	Resistor, Film, 2.21 Ohms, 1%, 1/2W	RC05	MF1/2DL2R21F	59124
R08	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
R09	Resistor, Film, 33K Ohms, 5%,2W	RBP22	GS-3, 33K OHMS	75042
R10	Resistor, MF, 15.0K Ohms, 1PC1/4W	RAB39	MF1/4DL1502F	59124
R11	Resistor, MF, 15.0K Ohms, 1PC1/4W	RAB39	MF1/4DL1502F	59124
R12	Installed at Next Higher Assy	+	INSTALLED AT NEXT HIGHER ASSY	37338
T01	Transformer Assy	197-1019	197-1019	37338
U01	IC, MOS Gate Driver, High Voltage	UN18	IR2110(STATIC)	81483
XU01	Socket, IC, 14-pin	UC02	2-641261-1	00779

NASM11A/02 Modulator (Jazz) Assy

REFDES	DESCRIPTION	NAUTEL #	VENDOR #	OEM CODE
C10	Capacitor, Ceramic, 0.01uF 10% 100V	CCG04	CKR05BX103KRV	56289
CR07	Diode, Power Rectifier, 4A, Ultra Fast	QM22	MUR460	04713
CR08	Diode, Ultrafast, Soft Recovery, 600V, 8A	QR24	HFA08TB60(STATIC)	81483
CR11	Diode, Zener Transient Supressor, 20V	QI29	P6KE20CA	07263
J01	Conn, Pin Header, 3-Pin, Mate-N-Lok	JT49	1-350943-0	00779
L01	Bead, Ferrite, 3.5mm, B Mtl	LXP20	21-030-B	33062
Q01	Transistor, FET, N Channel	QAP49	STW14NM50(STATIC)	OG343
Q02	St Transistor, FET, N, Channel	QAP50	IRF820(STATIC)	OG343
R06	Resistor, MF, 10.0 Ohms, 1PC 1/4W	RAB01	MF55D10R0F	59124
R08	Resistor, Film, 3.9 Ohms, 5%,2W	RBP40	211GS3-TO-3R90J	75042
R12	Resistor, MF, 10.0K Ohms, 1PC1/4W	RAB37	MF1/4DL1002F	59124

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Section 5 WIRING INFORMATION

5.1 INTRODUCTION

This section contains wiring information for hard-wired assemblies of the subject unit. Refer to Table 5-1 for an itemized listing of assemblies that have wiring lists.

5.2 WIRING LISTS NOT PROVIDED

Separate wiring lists are not provided for some assemblies, including:

- Assemblies that have separate maintenance manuals. Refer to the associated maintenance manual for detailed wiring information of these assemblies.
- Assemblies that have their wiring information adequately depicted/ tabulated on their assembly detail drawings. Refer to the associated assembly detail drawing for detailed wiring information of these assemblies.

5.3 PRINTED WIRING PATTERNS

Printed wiring pattern information is beyond the scope of this manual. Therefore, detailed printed wiring patterns for printed circuit boards are not included.

5.4 WIRE COLOURS

Every effort is made to manufacture the assemblies using wire that is the colour tabulated in the 'Code' column of the wiring list tables. In some instances, a white wire will be substituted. In this case identification must be determined by locating the assigned identification number.

5.5 WIRING LIST PROVIDED

Wiring lists are provided in table format. A list of the table numbers and the associated wiring list are shown in Table 5-1. These lists provide non-printed wiring pattern, point-to-point (source/destination) inter-connecting information.

Table 5-1: Wiring Lists Provided

Table #	Description
5-2	Wiring List - J1000 Transmitter
5-3	Wiring List – NAE88A/01 Exciter/Control Assembly
5-4	Wiring List - NARA39A/01 RF Power Assembly
5-5	Wiring List - NAP31/02 RF Power Module
5-6	Connector Mating Information - J1000 Transmitter

Table 5-2: Wiring List - J1000 Transmitter

Source	Destination	Wire #.	Color	Size	Remarks
P17-01	P16-01	301	Core	22	1-Conductor
P17-09	P16-09	301	Shield	-	Shielded
P17-03	P16-03	302	Core	22	1-Conductor
P17-10	P16-10	302	Shield	-	Shielded
P17-04	P16-04	303	White	22	
P17-05	P16-05	304	Core	22	1-Conductor
P17-06	P16-06	304	Shield	-	Shielded
P17-07	P16-07	305	Core	22	1-Conductor
P17-08	P16-08	305	Shield	-	Shielded
P17-13	P16-13	306	Core	22	1-Conductor
P17-12	P16-12	306	Shield	-	Shielded
P17-15	P16-15	308	Core	22	1-Conductor
P17-14	P16-14	308	Shield	-	Shielded
P19-01	P18-01	309	Core	22	1-Conductor
P19-09	P18-09	309	Shield	-	Shielded
P19-03	P18-03	310	Core	22	1-Conductor
P19-10	P18-10	310	Shield	-	Shielded
P19-04	P18-04	311	White	22	
P19-05	P18-05	312	Core	22	1-Conductor
P19-06	P18-06	312	Shield	-	Shielded
P19-07	P18-07	313	Core	22	1-Conductor
P19-08	P18-08	313	Shield	-	Shielded
P19-13	P18-13	314	Core	22	1-Conductor
P19-12	P18-12	314	Shield	-	Shielded
-	-	315	Not Used		
P19-15	P18-15	316	Core	22	1-Conductor
P19-14	P18-14	316	Shield	-	Shielded
P11-11	P12-08	317	Core	22	1-Conductor
P11-12	P12-09	317	Shield	-	Shielded
P11-01	P12-02	318	Core	22	1-Conductor
P11-02	P12-03	318	Shield	-	Shielded
P11-05	P12-04	319	Core	22	1-Conductor
P11-06	P12-05	319	Shield	-	Shielded
P11-09	P22	320	Core	22	1-Conductor
P11-10	P22	320	Shield	-	Shielded
P16-02	P17-02	325	White	22	
P18-02	P19-02	326	White	22	
P23	P24	329	Core	RG188	Coaxial Cable
P23	P24	329	Shield	-	

Table 5-3: Wiring List – NAE88/01 Exciter/Control Assembly

Source	Destination	Wire #	Color	Size	Remarks
P25-01	P26-01	321	White	22	
P25-02	P26-02	322	White	22	
P25-05	P26-03	323	Black	22	
P25-06	P26-04	324	Black	22	
E1-B	P29-03	401	White	20	
J1-N	A9-E1	402	White	20	
E2-B	P29-05	403	White	20	
J1-L	A9-E2	404	White	20	
J1-Gnd	Chassis Gnd	405	Grn/Yel	14	
B01	P25-01	-	Red		
B01	E3-A	-	Black		
B02	E3-B	-	Red		
B02	Ground	-	Black		
Chassis Gnd	P29-01	410	Black	20	
Chassis Gnd	P30-01	-	Black	20	
E1-B	P30-03	-	White	20	
E2-B	P30-05	-	White	20	
J1-N	E1-A	-	White	20	
J1-L	E2-A	-	White	20	

Table 5-4: Wiring List - NARA39A/01 RF Power Assembly

Source	Destination	Wire #	Color	Size	Remarks
T1-01	J4-01	-	Yellow	14	T1 Lead
GND	J4-03	_	Yellow	14	
T1-04	J5-01	_	Yellow	14	T1 Lead
GND	J5-03	_	Yellow	14	
T1-05	J2-Centre	_	Yellow	14	T1 Lead
T1-06	GND	_	Yellow	14	T1 Lead
T1-02	A3E6	_	Yellow	14	T1 Lead
T1-03	A3E6	_	Yellow	14	T1 Lead
T2-01	A3E8	_	Yellow	14	T2 Lead
T2-02	GND	_	Yellow	14	T2 Lead
T2-03	A3T1	_	Yellow	14	T2 Lead
T2-04	A3E7	_	Yellow	14	T2 Lead
T2-05	A3T1	_	Yellow	14	T2 Lead
T2-06	A3E7	_	Yellow	14	T2 Lead
L1-02	A3E1	-	Black	660/46	L1 Lead
L1-03	A3E2	-	Black	660/46	L1 Lead
L1-01	A3E3	_	Black	660/46	L1 Lead
A3E5	A4E4	-	Yellow	12	
L3	GND	-	Yellow	12	
A3E4	L3 Clip	-	Yellow	12	
A3E9	L2 Clip	-	Yellow	12	
J3-LINE	F1-Centre	-	White	14	
J3-NEUTRAL	F3-Centre	-	White	14	
J3-GND	GND	-	Grn/Yw	14	
P20-02	F3 Side	-	Blue	14	
P21-02	F4 Side	-	Blue	14	
J3-LINE	F2-Centre	-	White	14	
J3-NEUTRAL	F4-Centre	-	White	14	
F1 Side	P20-01	-	Brown	14	
F2 Side	P21-01	-	Brown	14	
GND	P20-03	-	Grn/Yw	14	
GND	P21-03	-	Grn/Yw	14	
L4-02	A4E1	-	Black	660/46	L4 Lead
L4-03	A4E2	-	Black	660/46	L4 Lead
L4-01	A4E3	-	Black	660/46	L4 Lead
A4TB1-04	J1-Centre	-	Yellow	14	
L2	GND	-	Yellow	12	
A4A	A4TB1-01	-	Yellow	14	
GND	P20	-	Shield	14	
GND	P21	-	Shield	14	

NOTE: Wire sizes 660/46 indicate 660 strands of 46 AWG litz wire.

Table 5-5: Wiring List - NAP31/02 RF Power Module

Source	Destination	Wire #	Color	Size	Remarks
P3-01	P2-01	-	White	14	
P3-03	P2-03	-	Black	14	
B1	E1	-	Red		
B1	E2	-	Black		
B1	E3	-	Blue		

Table 5-6: Connector Mating Information - J1000 Transmitter

Connector	Mate	Connector	Mate
A2A1P2	A2A1A1J2	P15	A2A2A1J1
A2A1P3	A2A1A3J1	P16	A1A3J8
A2A1B1E1	A2A1A1E1	P17	A2A1J3
A2A1B1E2	A2A1A1E2	P18	A1A3J9
A2A1B1E3	A2A1A1E3	P19	A2A2J3
A2A2P2	A2A2A1J2	P20	A2A1A1J3
A2A2P3	A2A2A3J1	P21	A2A2A1J3
A2A2B1E1	A2A2A1E1	P22	A1A2J12
A2A2B1E2	A2A2A1E2	P23	A2A3J1
A2A2B1E3	A2A2A1E3	P24	A2A4J2
P1	A1A2J1	P25	A1A8CN2
P2	A1A1J1	P26	A1A9J3
P3	A1A1J4	P27	No Used
P4	A1A3J5	P28	No Used
P5	A1A1J5	P29	A1A8CN1
P6	A1A3J7	P30	Not Used
P7	A1A9J2	P31	Not Used
P8	A1A3J10	P32	A1A9J1
P9	A1A3J6	P33	A1J1
P10	A1A2J4	P34	A1A2J7
P11	A2A4J1	P35	A1A4J2
P12	A1A1J7	P36	A1A2J8
P13	A1A1J8	P37	A1A6J2
P14	A1A1A1J1		

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Section 6 ELECTRICAL SCHEMATICS

6.1 INTRODUCTION
This section contains electrical schematics for the subject equipment. Block diagrams, simplified electrical schematics, and logic diagrams may also be included. Refer to Table 6-1 for an itemized listing.

6.2 COMPONENT VALUES
Unless otherwise specified on the logic/ schematic diagram, the following applies:

- Resistor values are shown in ohms (Ω). (K = 1000 and M = 1 000 000).
- Resistor power ratings are not shown when less than 0.5 W.
- Capacitor values are shown in microfarads (μF).
- Unidentified diodes are part number 1N4938.

6.3 GRAPHIC SYMBOLS
The graphic symbols used are in accordance with American National Standard ANSI Y32.2-1975 - Graphic Symbols for Electrical and Electronic Diagrams.

6.4 LOGIC SYMBOLS
The logic symbols used on electrical schematics and logic diagrams are in accordance with American National Standard ANSI Y32.14-1975 - Graphic Symbols for Logic Diagrams.

6.5 REFERENCE DESIGNATIONS
Reference designations were assigned in accordance with American National Standard ANSI Y32.16-1975 - Reference Designations for Electrical and Electronic Parts and Equipment. Each electrical symbol is identified with its basic reference designation. To obtain the full reference designation for a specific part, this basic identifier must be prefixed with the reference designation assigned to all higher assemblies.

6.6 UNIQUE SYMBOLOGY
Nautel utilizes unique symbology on electrical schematics to describe two-state (logic) inputs/outputs that differ from those inputs/ outputs having only one distinct state or multiple states (analog).

6.6.1 Type of Inputs/Outputs
On electrical schematics, names used to describe two-state (logic) inputs/outputs are prefixed by a '#'. Those inputs/outputs representing a one-state or analog signal will have no prefix.

6.6.2 Logic Level/Convention
The '#' prefix identifies an input/output that has two distinct states - 'high' and 'low'. A suffix, '+' or '-', identifies the active (true) state of the input/output. The 'high' (+) is the more positive of the two levels used to represent the logic states. The 'low' (-) is the less positive of the two levels used to represent the logic states. Two types of logic, positive and negative, may be represented on a particular schematic. In positive logic, 'high' represents the active (true) state and 'low' represents the inactive (false) state. In negative logic, 'low' represents the active state and 'high' represents the inactive state.

6.7 IDENTIFICATION OF SCHEMATIC DIAGRAMS
A number that is both the figure number and the page number identifies each illustration in this section. The numbers are assigned sequentially and are prefixed by the letters 'SD-'. The electrical schematics/logic diagrams included in this section are listed in Table 6-1.

6.8 STRUCTURE OF SCHEMATICS

The electrical schematics are structured in a hierarchical format that is based on function and signal flow. Wherever practical, the signal flow is from left to right. Inputs normally originate on the left-hand side and outputs will extend to the right-hand side. Exceptions are shown by an arrow indicating the direction of signal flow.

NOTE

The physical location of a part/assembly was not necessarily a factor when a schematic was drawn. The full reference designation assigned to a part/assembly, in conjunction with the family tree in Figure 4-1 and the assembly detail drawings in section 7, will identify its location.

Figures SD-1 through SD-3 identify each major stage and its detailed interconnection. Each stage contains cross-references that identify which block is the signal source for inputs or the destination for outputs.

When a sub-function is treated as a block in Figures SD-1 through SD-3, its detailed circuit information is included in its own schematic drawing(s), also included in this section.

6.9 LOCATING THE SCHEMATIC DIAGRAM(S) FOR A FUNCTIONAL BLOCK

The text inside a functional block provides the key to locating its schematic diagram(s). When a functional block is assigned a reference designation, refer to the family tree depicted in Figure 4-1 and follow the family tree branches to the block that contains the reference designation and associated Nautel nomenclature (e.g., NAP31/02). Refer to Table 6-1 with the Nautel nomenclature number and/or the description to identify the appropriate figure number(s).

6.10 LOCATING A PART/ASSEMBLY IDENTIFIED ON A SCHEMATIC

The full reference designation assigned to a part/assembly is the key to physically locating that part/assembly.

NOTE

Full reference designations contain the assembly hierarchical coding. When the end item is divided into units (cabinets), the first coding is a unit number (1, 2, 3, etc). When the end item is divided into assemblies, the first coding is an assembly number (A1, A2, A3, etc). If a unit or an assembly is divided into sub-assemblies, assembly coding that identifies assembly relationship (1A1, A2A1, A2A1A1, etc) is added.

Refer to the family tree depicted in Figure 4-1 with the full reference designation and follow the family tree branches to the appropriate block, noting the name and Nautel nomenclature number of all higher assemblies in the path.

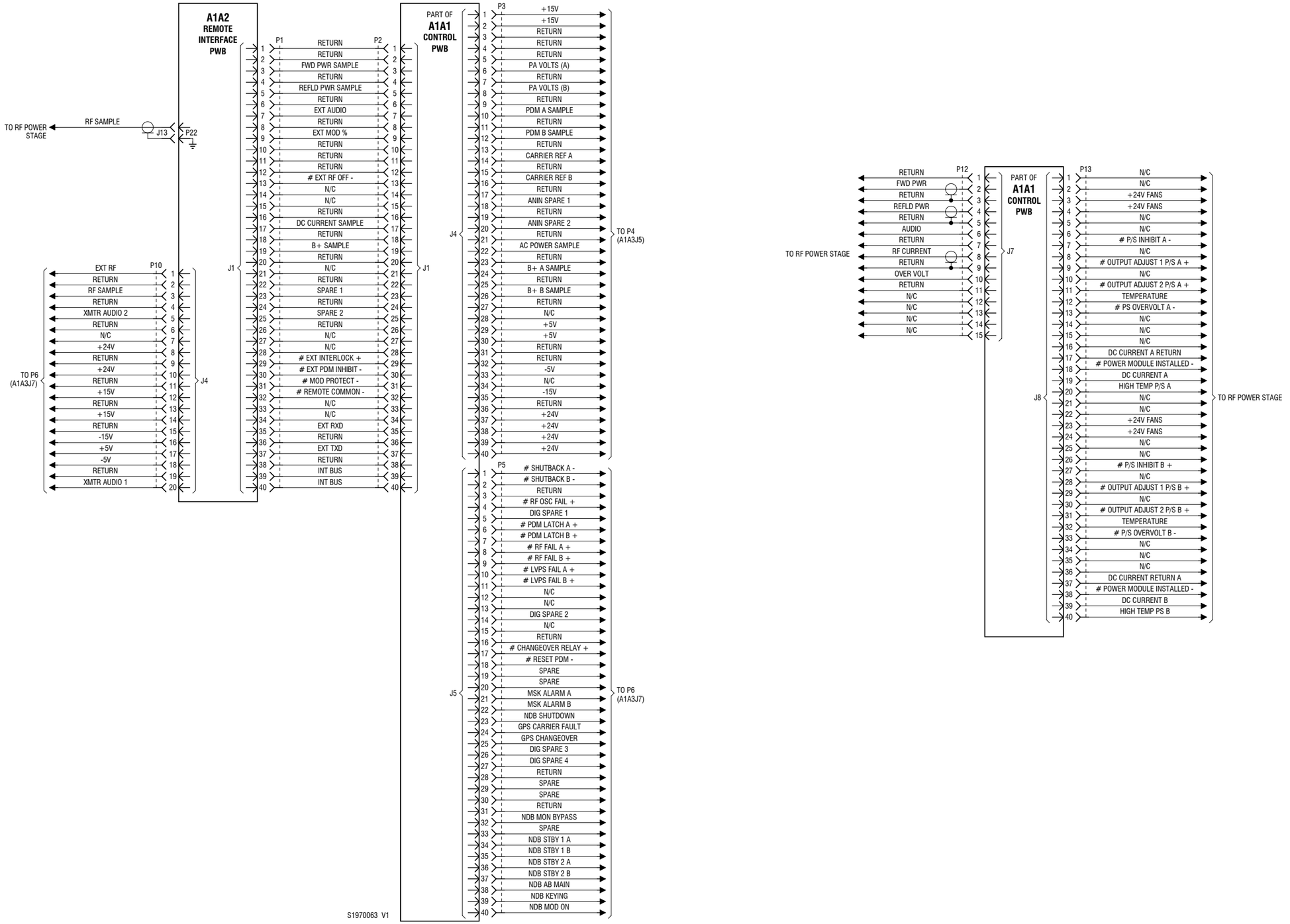
NOTE

The drawings in Section 7 depict the assembly detail of the transmitter and its modules/assemblies.

Refer to Table 7-1 with the name and Nautel nomenclature number of each family tree block in the path, starting at the highest assembly (normally Figure MD-1) and determine the figure number(s) for that assembly. Refer to the referenced figure and locate the next lower level assembly. Repeat this procedure until the location of the required part/assembly is found.

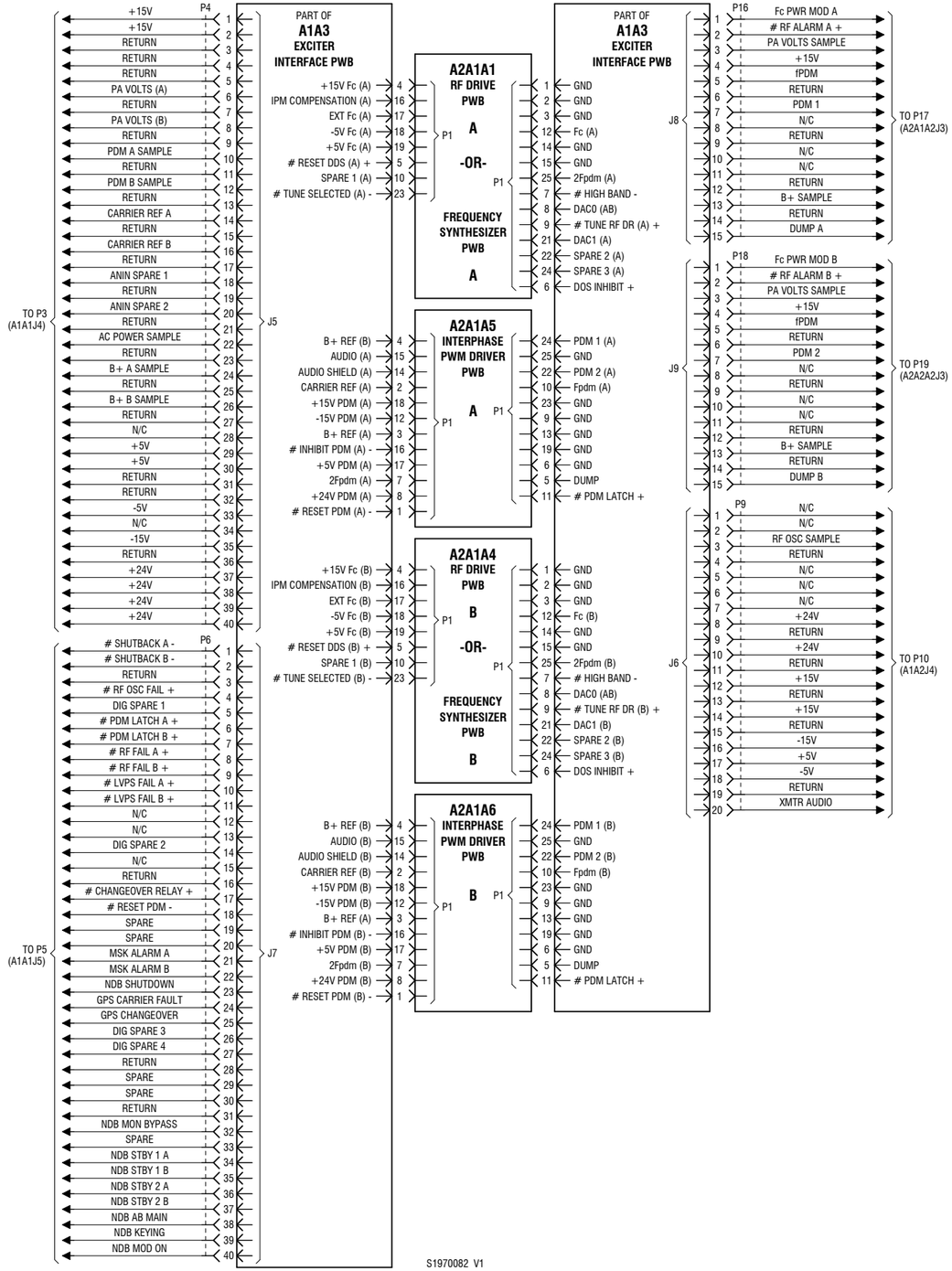
Table 6-1: Electrical Schematics

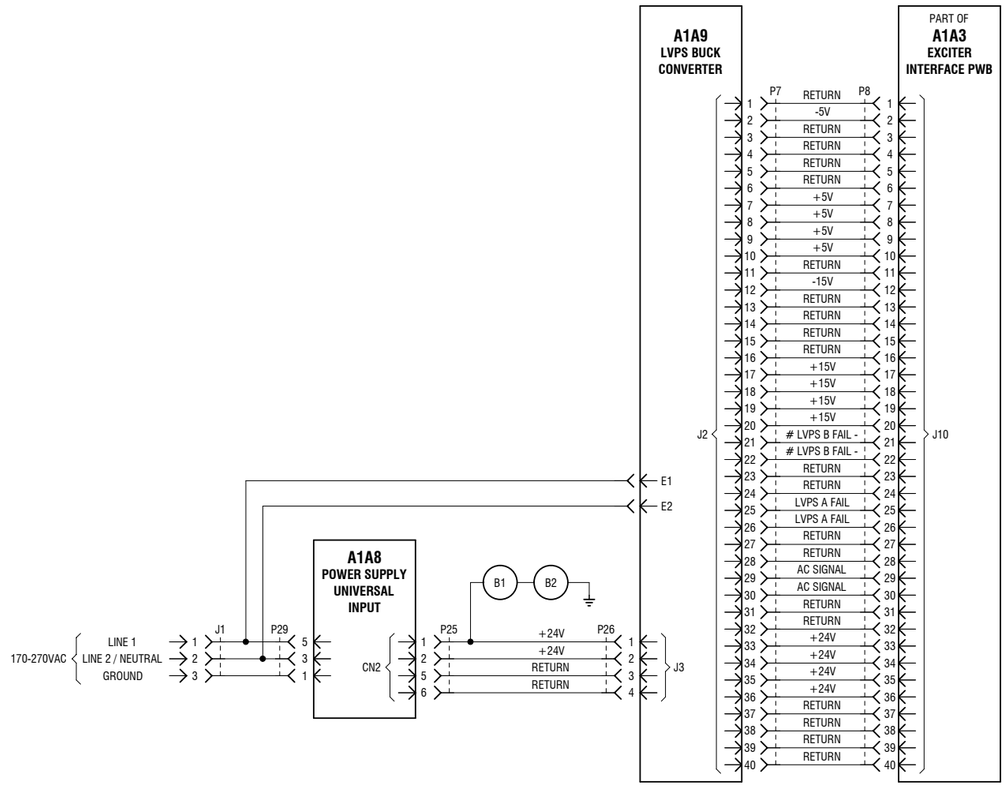
Figure #	Description
SD-1	Electrical Schematic - J1000 Transmitter - Control/Monitor Function
SD-2	Electrical Schematic - J1000 Transmitter - Exciter Stage
SD-3	Electrical Schematic - J1000 Transmitter - RF Power Stage
SD-4	Electrical Schematic - Controller/Display PWB (NAPC143A/01) Sheet 1 of 4
SD-5	Electrical Schematic - Controller/Display PWB (NAPC143A/01) Sheet 2 of 4
SD-6	Electrical Schematic - Controller/Display PWB (NAPC143A/01) Sheet 3 of 4
SD-7	Electrical Schematic - Controller/Display PWB (NAPC143A/01) Sheet 4 of 4
SD-8	Electrical Schematic - Remote Interface PWB (NAPI85/01) Sheet 1 of 3
SD-9	Electrical Schematic - Remote Interface PWB (NAPI85/01) Sheet 2 of 3
SD-10	Electrical Schematic - Remote Interface PWB (NAPI85/01) Sheet 3 of 3
SD-11	Electrical Schematic - Exciter Interface PWB (NAPI87/01)
SD-12	Electrical Schematic - RF Synthesizer PWB (NAPE70B) Sheet 1 of 2
SD-13	Electrical Schematic - RF Synthesizer PWB (NAPE70B) Sheet 2 of 2
SD-14	Electrical Schematic - Interphase PDM Driver PWB (NAPM10A/01)
SD-15	Electrical Schematic - LVPS Buck Converter PWB (NAPS28A)
SD-16	Electrical Schematic - RF Power Module (NAP31/02)
SD-17	Electrical Schematic - Forward Converter PWB (NAPS31A/03)



Dimensions = mm (inches)

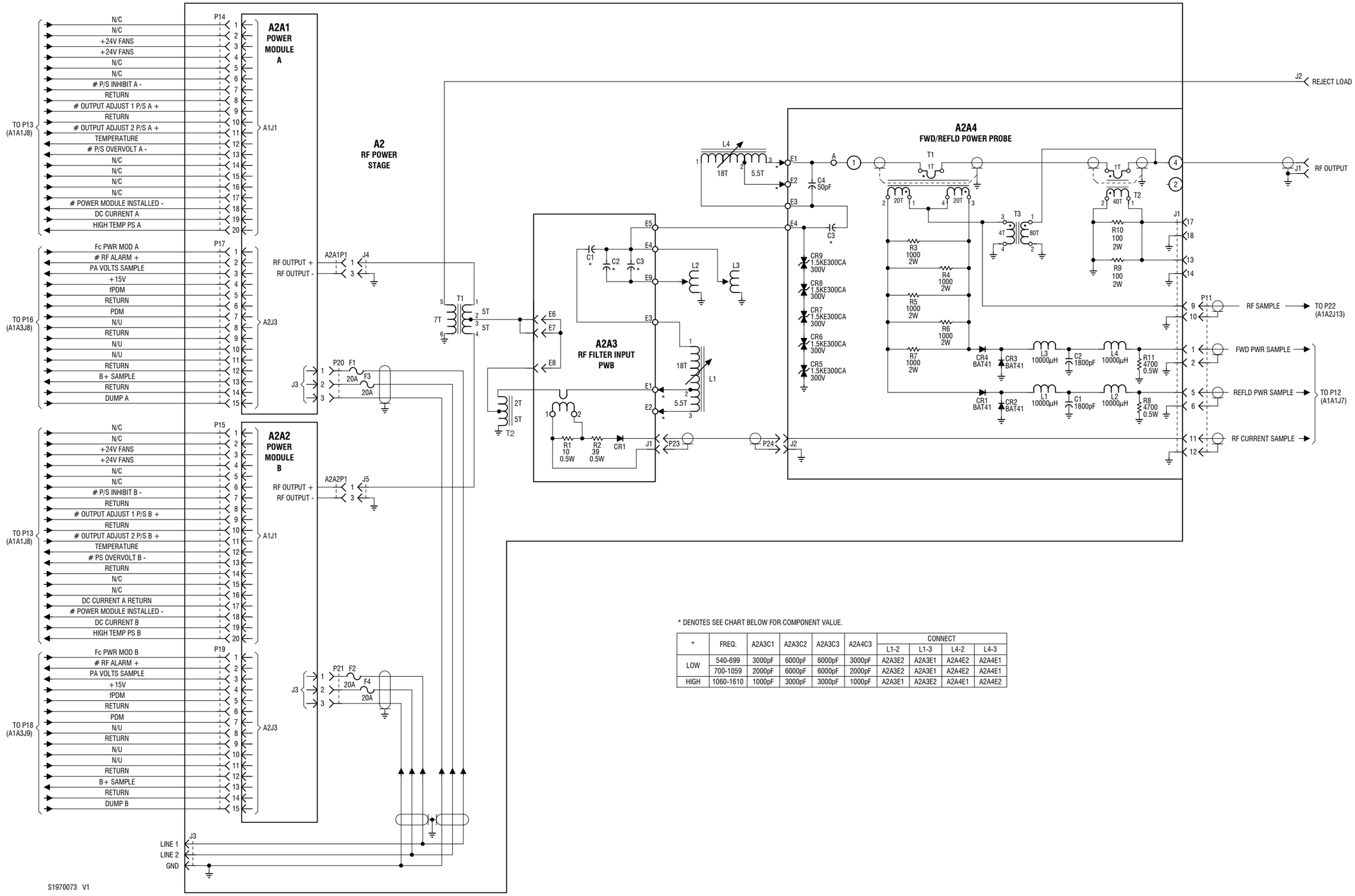
Electrical Schematic - J1000 Transmitter - Control/Monitor Function			
Original Issue 3.0	Not to Scale	Figure SD-1	Sheet 1 of 1





Dimensions = mm (inches)

Electrical Schematic - J1000 Transmitter - Exciter Stage			
Original Issue 3.0	Not to Scale	Figure SD-2	Sheet 1 of 1

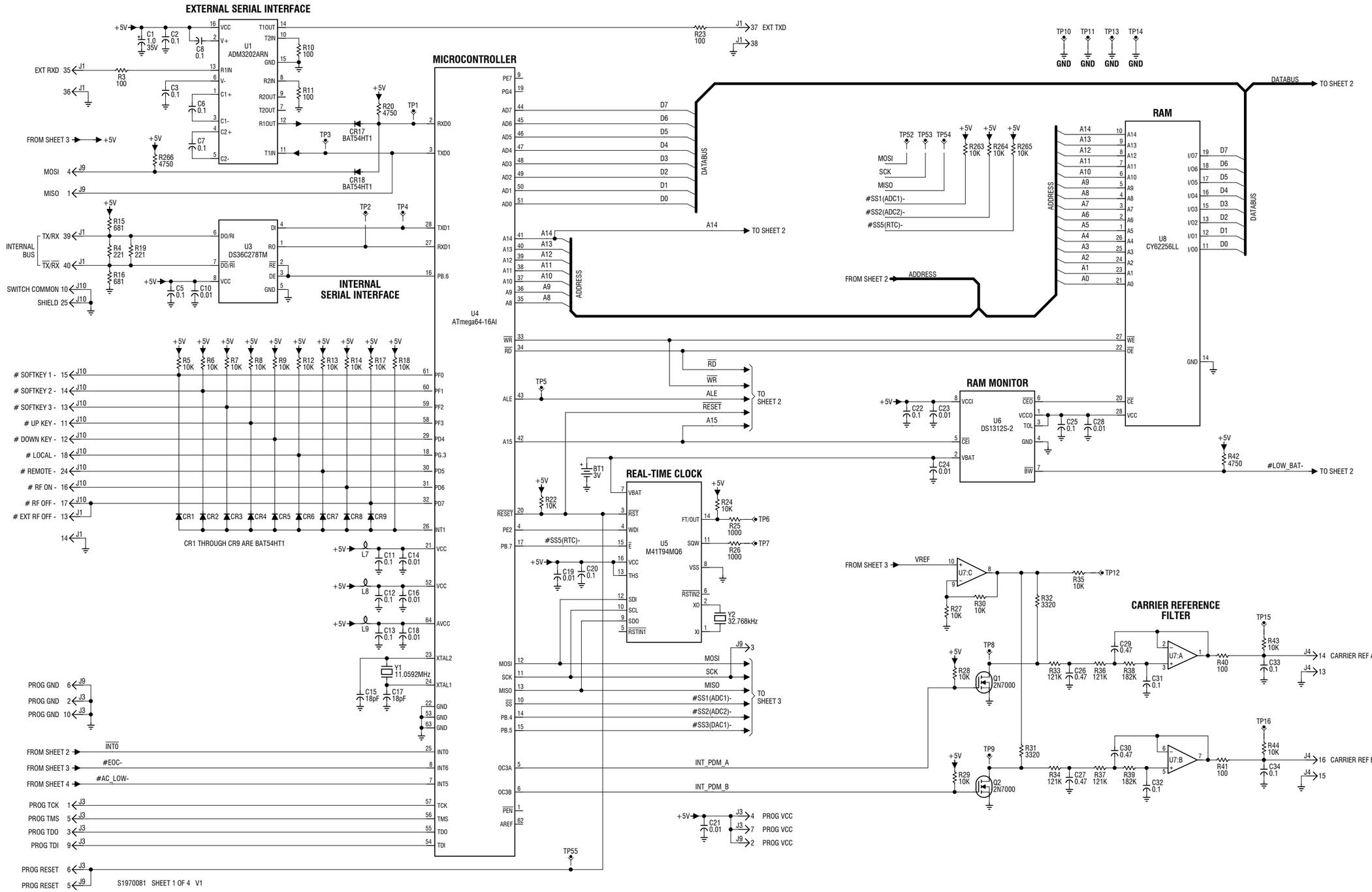


* DENOTES SEE CHART BELOW FOR COMPONENT VALUE.

*	FREQ.	A2A3C1	A2A3C2	A2A3C3	A2A4C3	CONNECT			
						L1-2	L1-3	L4-2	L4-3
LOW	540-699	3000pF	6000pF	6000pF	3000pF	A2A3E2	A2A3E1	A2A4E2	A2A4E1
	700-1059	2000pF	6000pF	6000pF	2000pF	A2A3E2	A2A3E1	A2A4E2	A2A4E1
HIGH	1060-1610	1000pF	3000pF	3000pF	1000pF	A2A3E1	A2A3E2	A2A4E1	A2A4E2

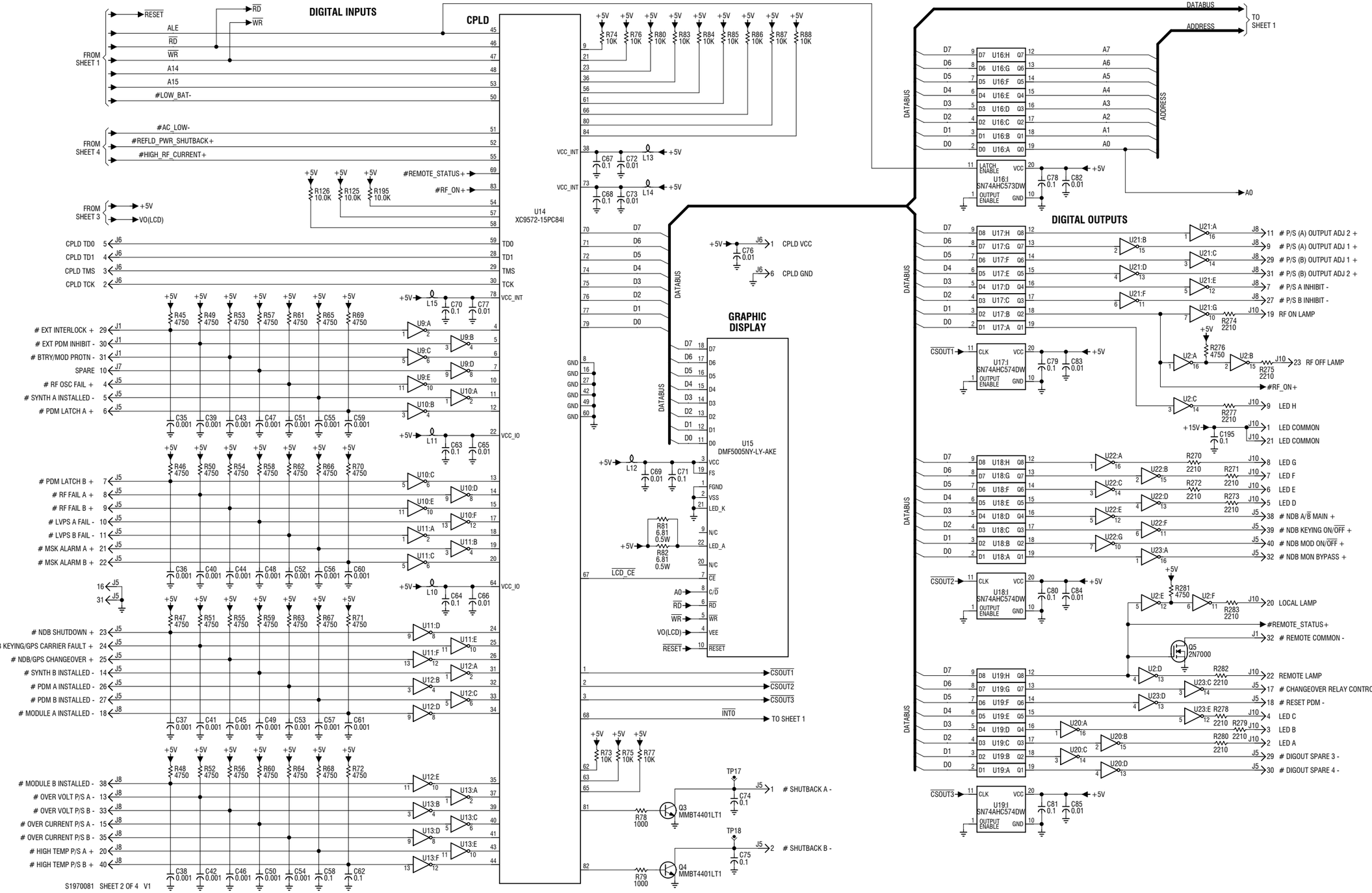
Dimensions = mm (inches)

Electrical Schematic - J1000 Transmitter - RF Power Stage			
Original Issue 3.0	Not to Scale	Figure SD-3	Sheet 1 of 1



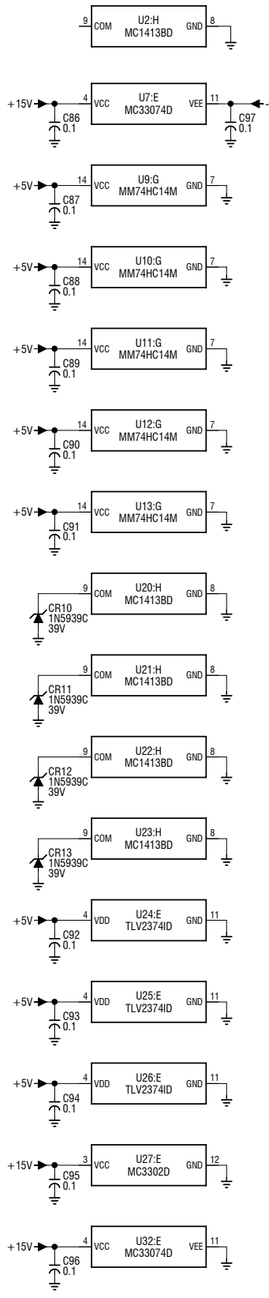
Dimensions = mm (inches)

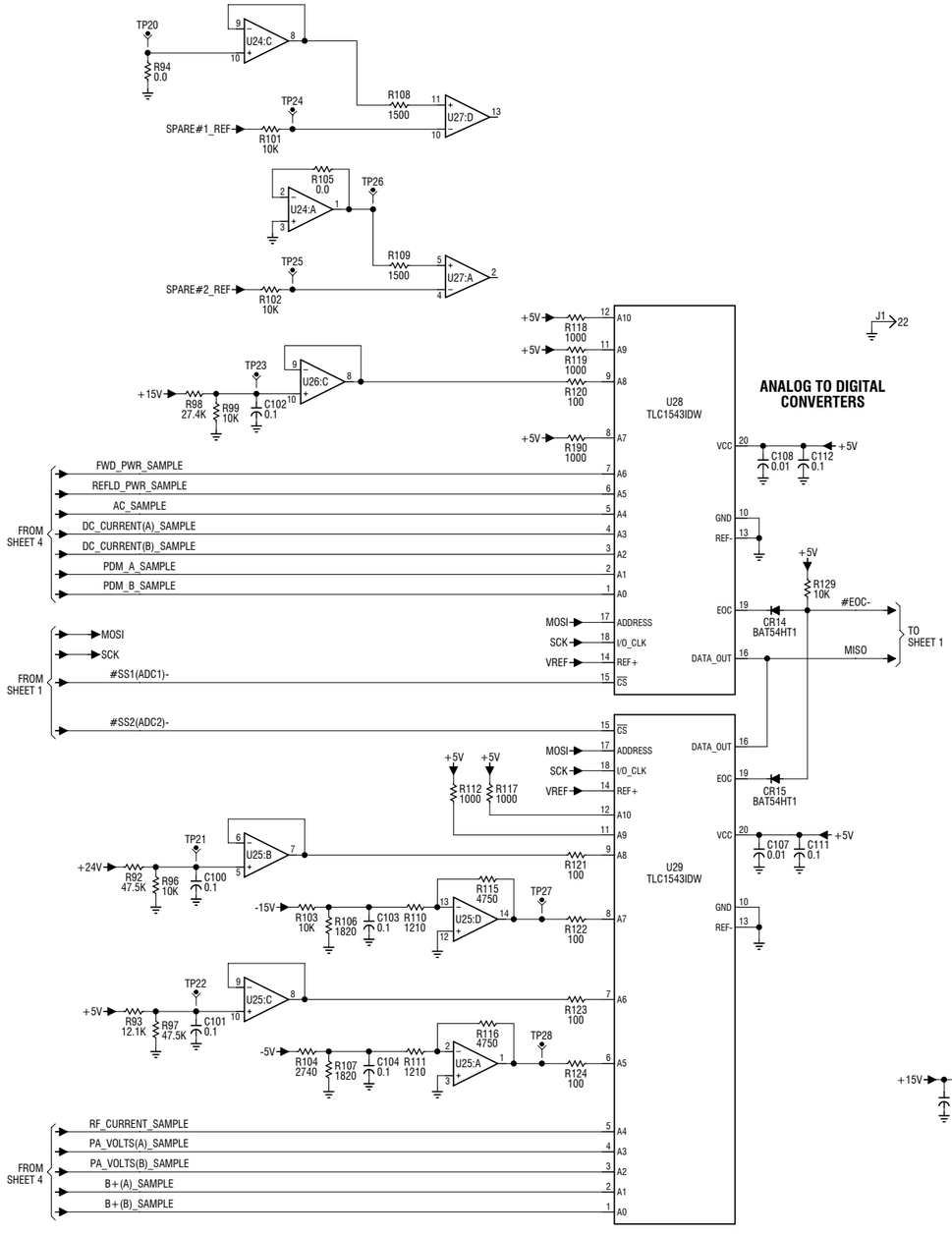
Electrical Schematic - Controller/Display PWB (NAPC143A/01)			
Original Issue 3.0	Not to Scale	Figure SD-4	Sheet 1 of 4

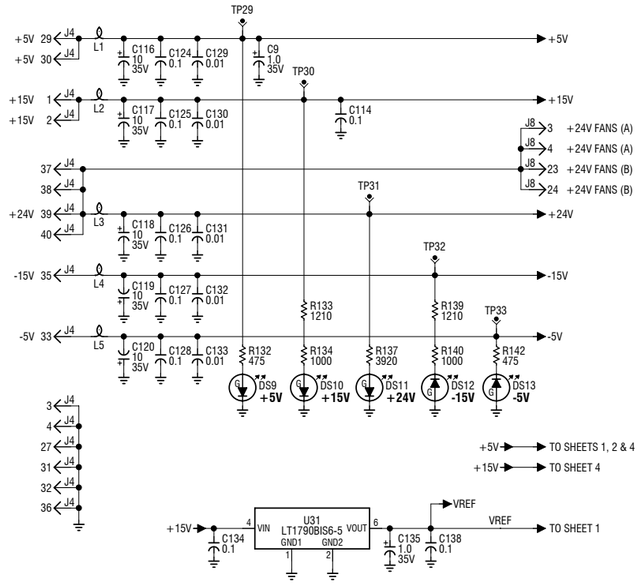


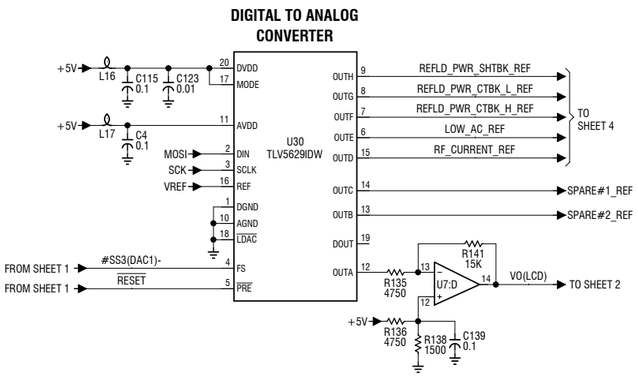
Dimensions = mm (inches)

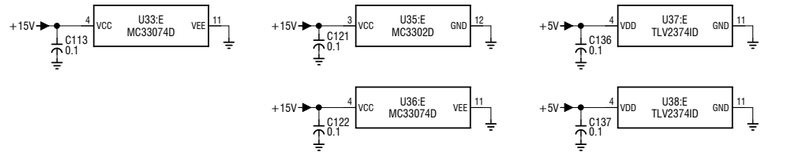
Electrical Schematic - Controller/Display PWB (NAPC143A/01)			
Original Issue 3.0	Not to Scale	Figure SD-5	Sheet 2 of 4





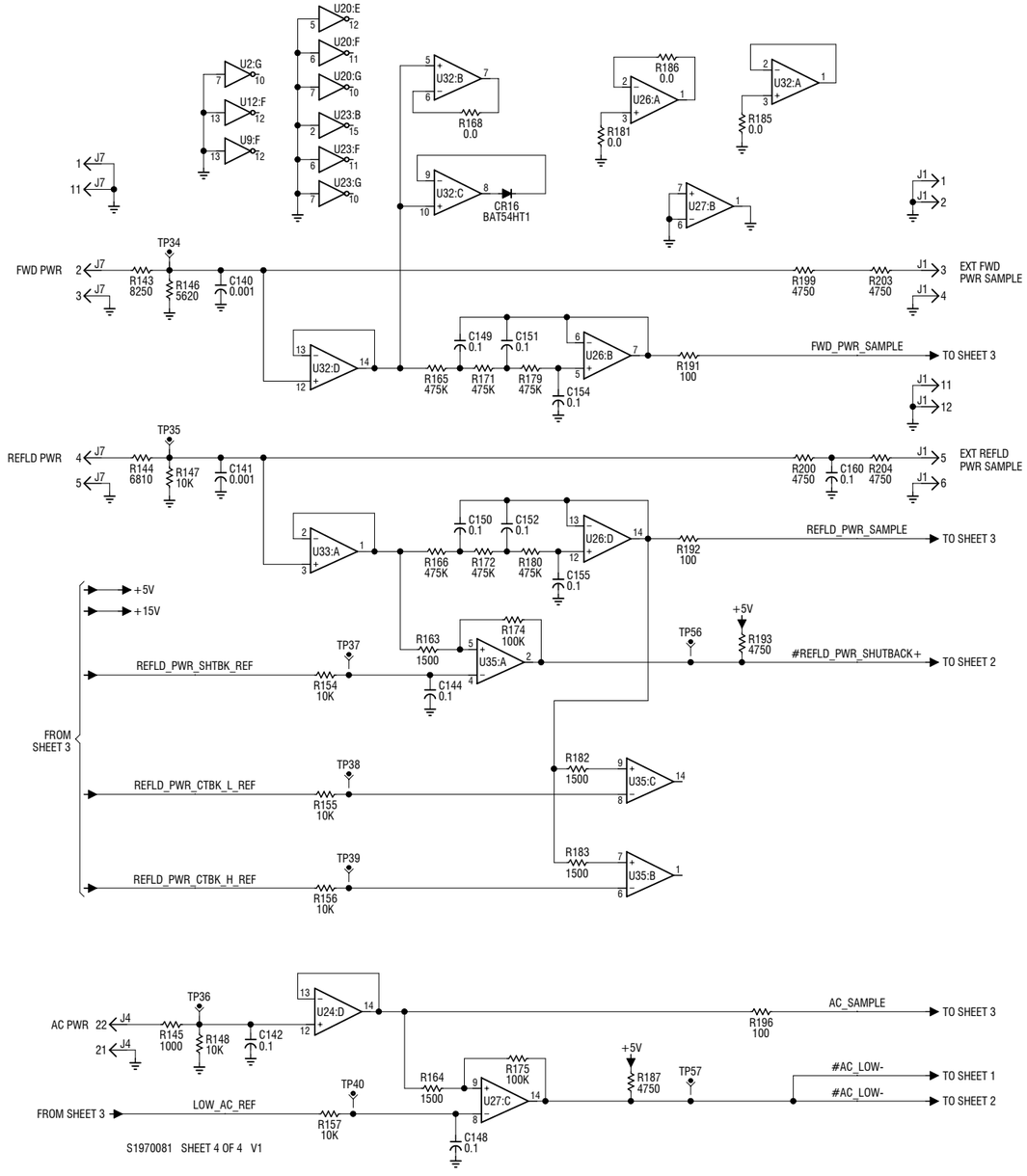


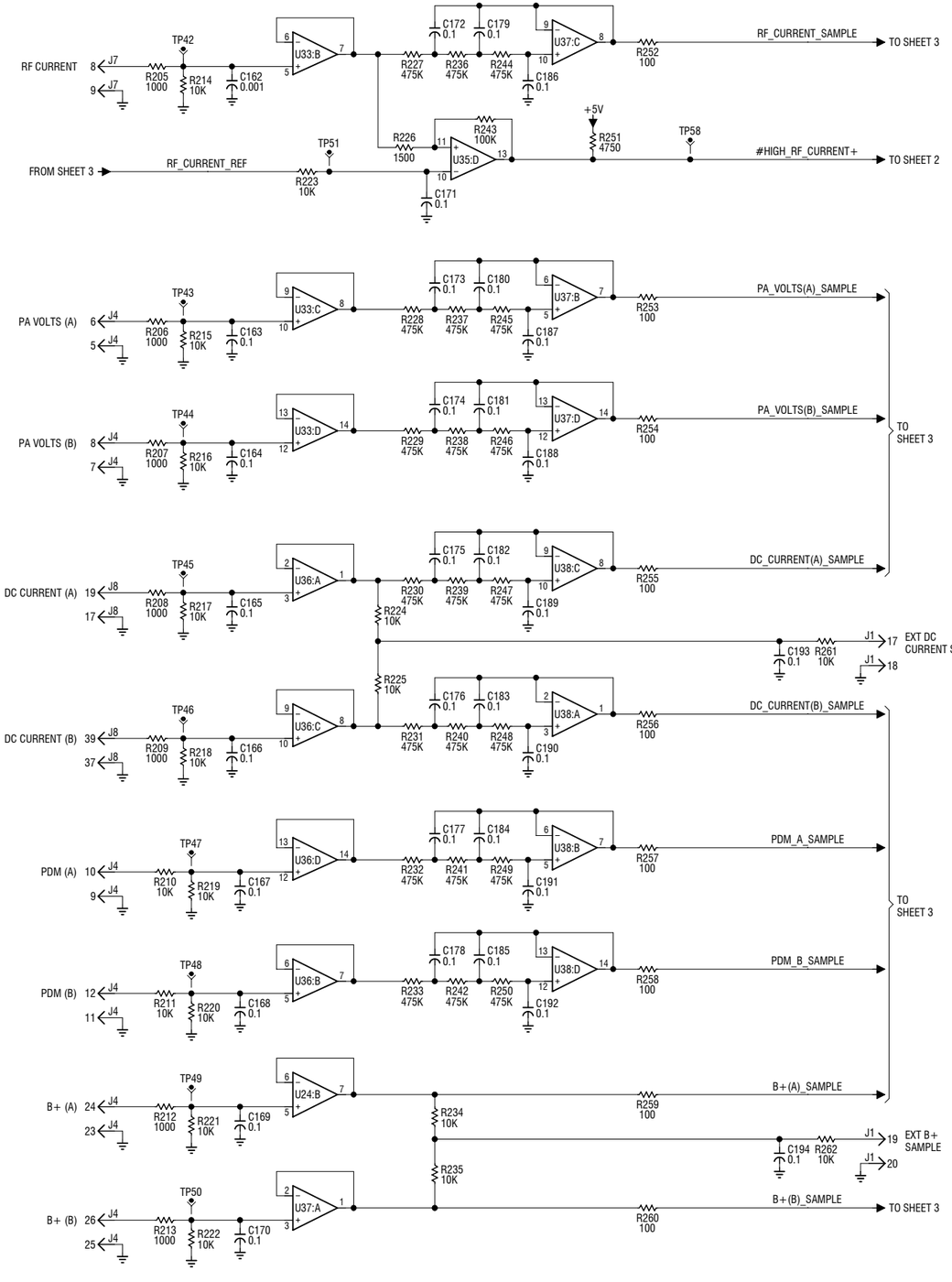




Dimensions = mm (inches)

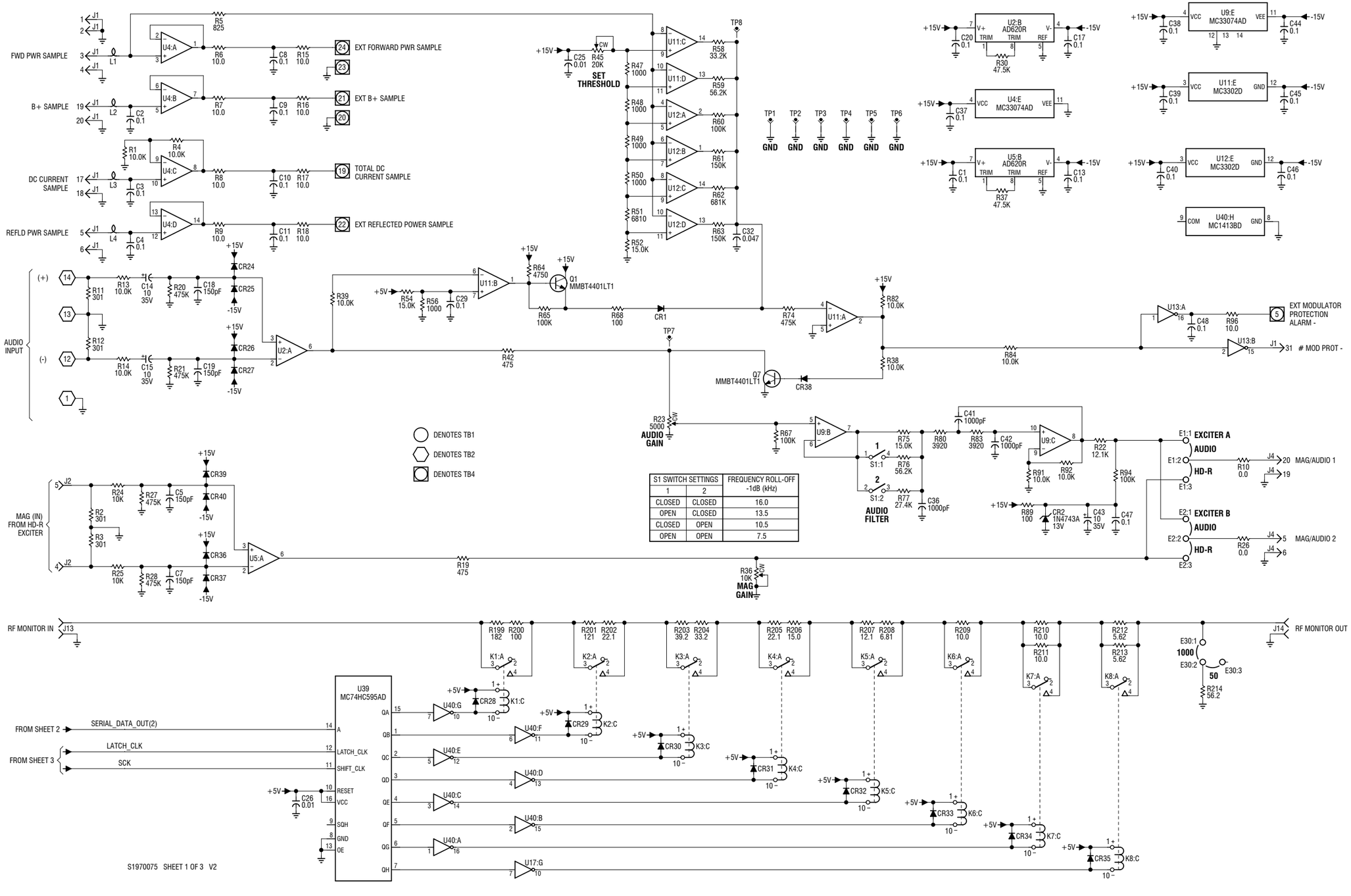
Electrical Schematic - Controller/Display PWB (NAPC143A/01)			
Original Issue 3.0	Not to Scale	Figure SD-6	Sheet 3 of 4





Dimensions = mm (inches)

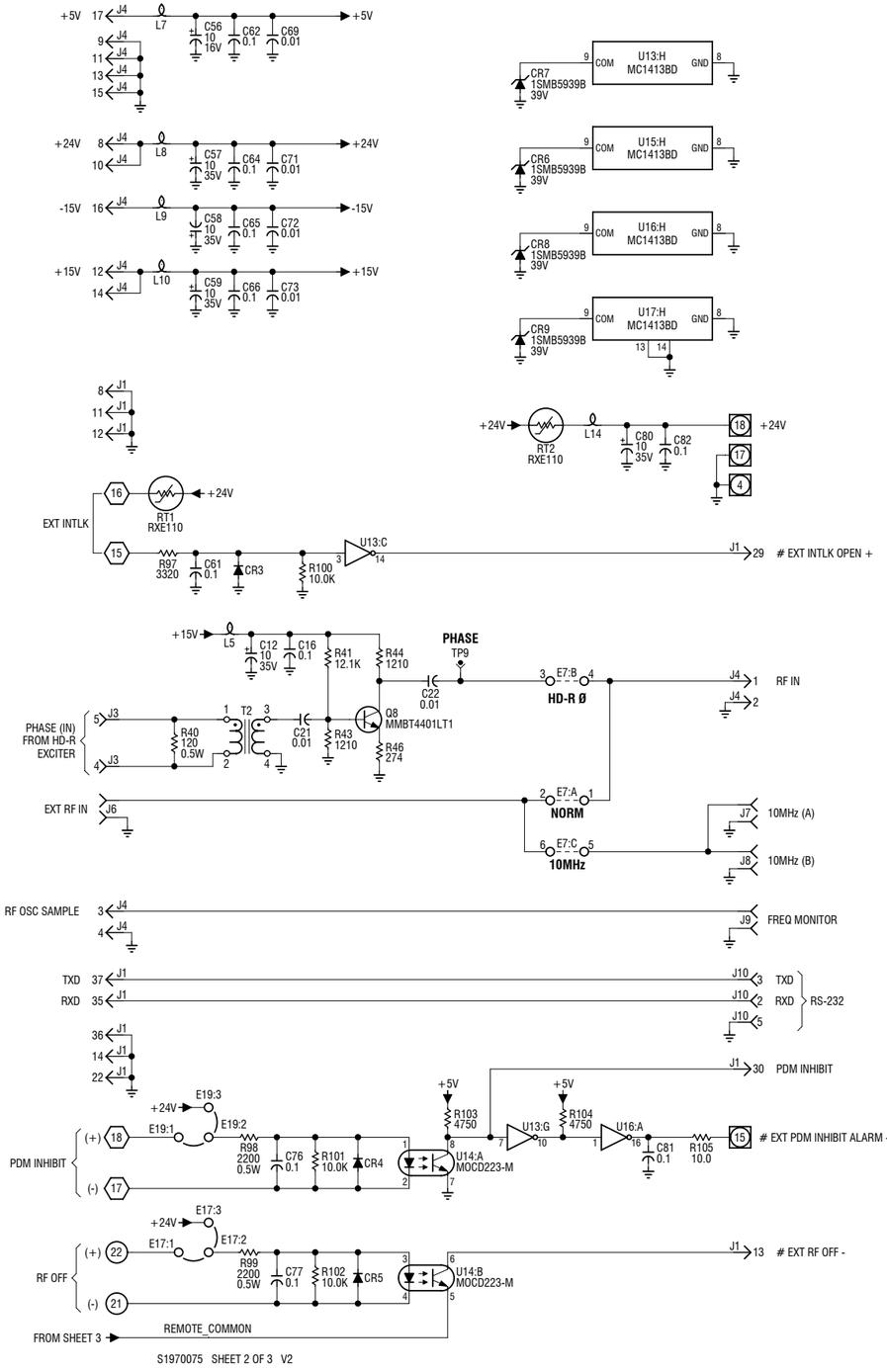
Electrical Schematic - Controller/Display PWB (NAPC143A/01)			
Original Issue 3.0	Not to Scale	Figure SD-7	Sheet 4 of 4

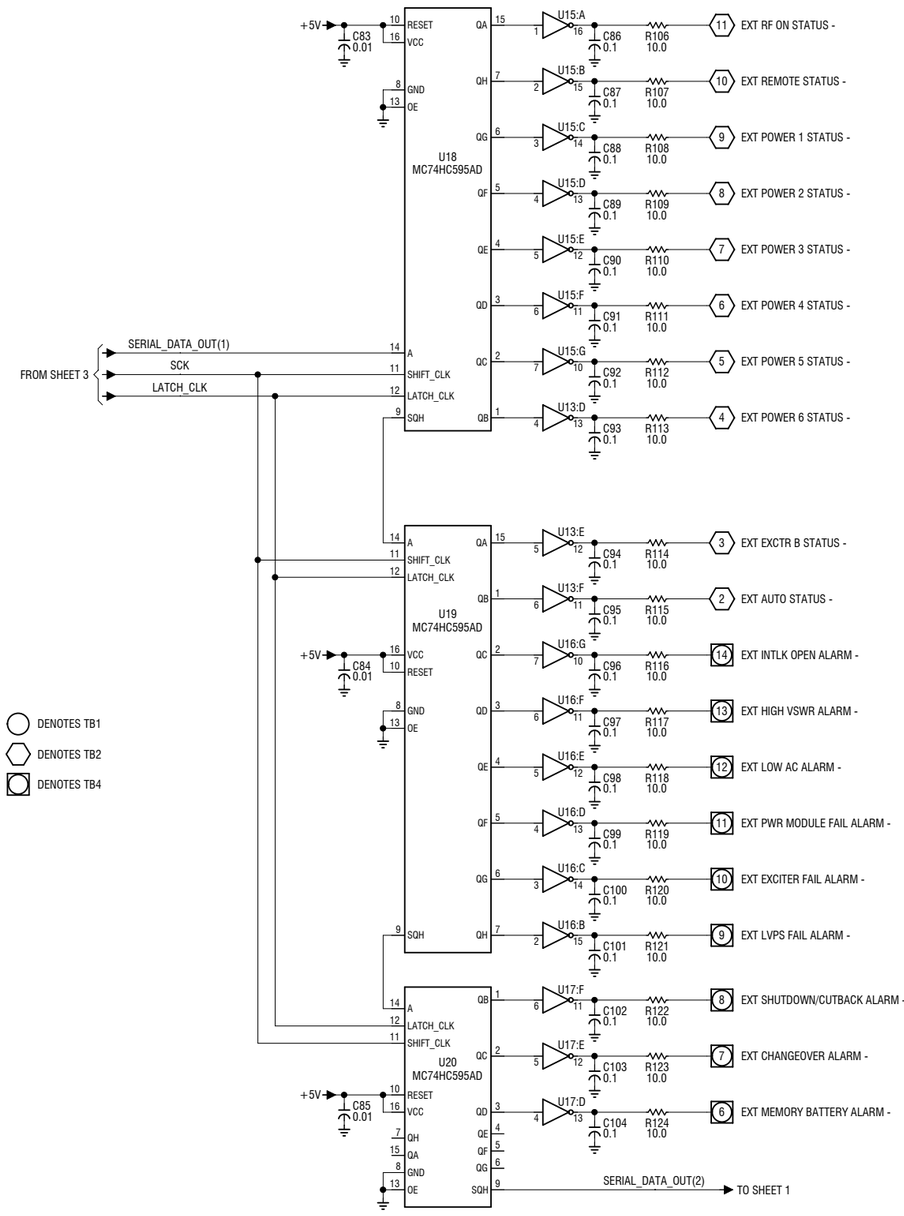


S1 SWITCH SETTINGS		FREQUENCY ROLL-OFF
1	2	-1dB (kHz)
CLOSED	CLOSED	16.0
OPEN	CLOSED	13.5
CLOSED	OPEN	10.5
OPEN	OPEN	7.5

Dimensions = mm (inches)

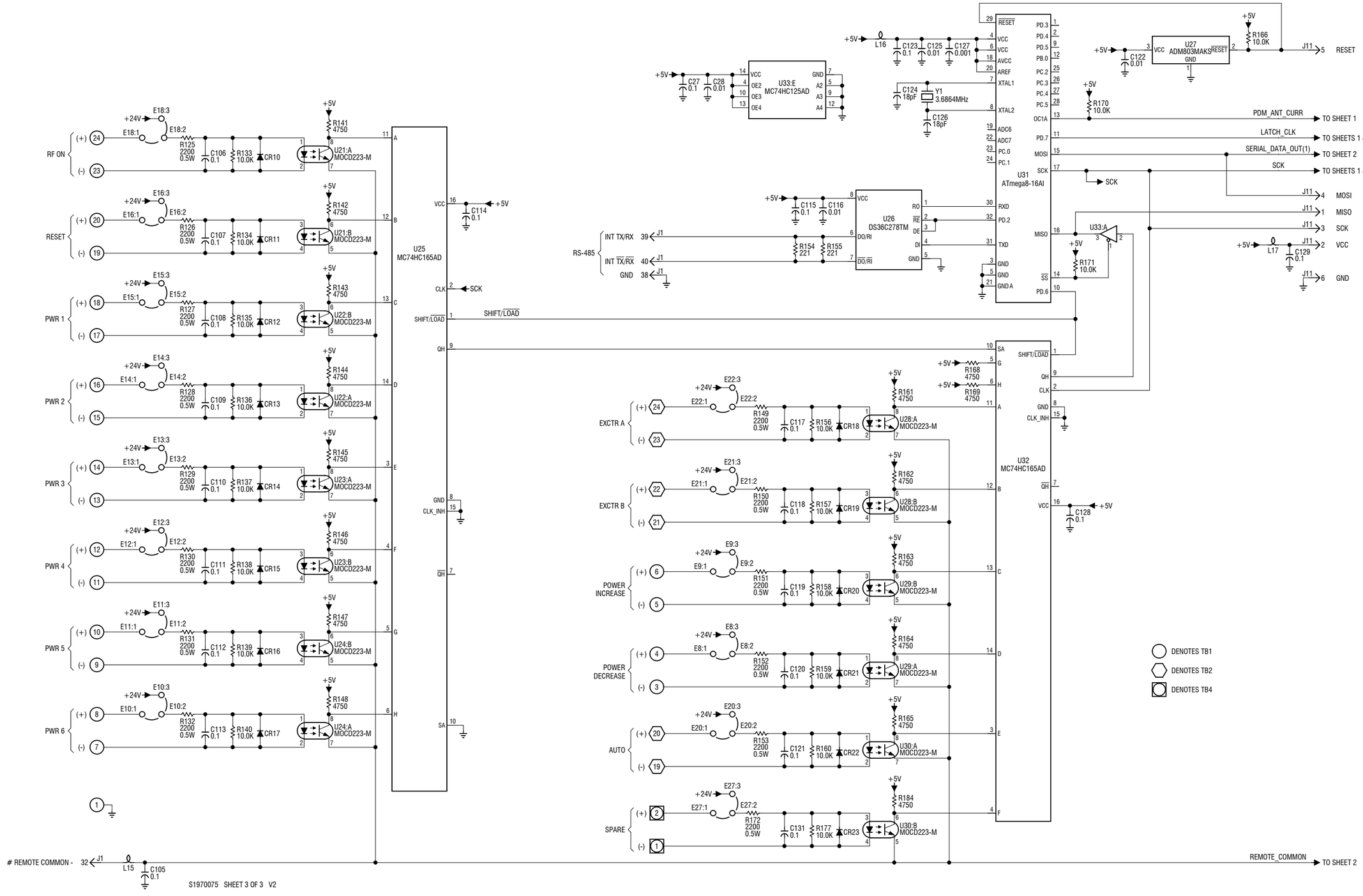
Electrical Schematic - Remote Interface PWB (NAPI85/01)			
Original Issue 3.0	Not to Scale	Figure SD-8	Sheet 1 of 3





Dimensions = mm (inches)

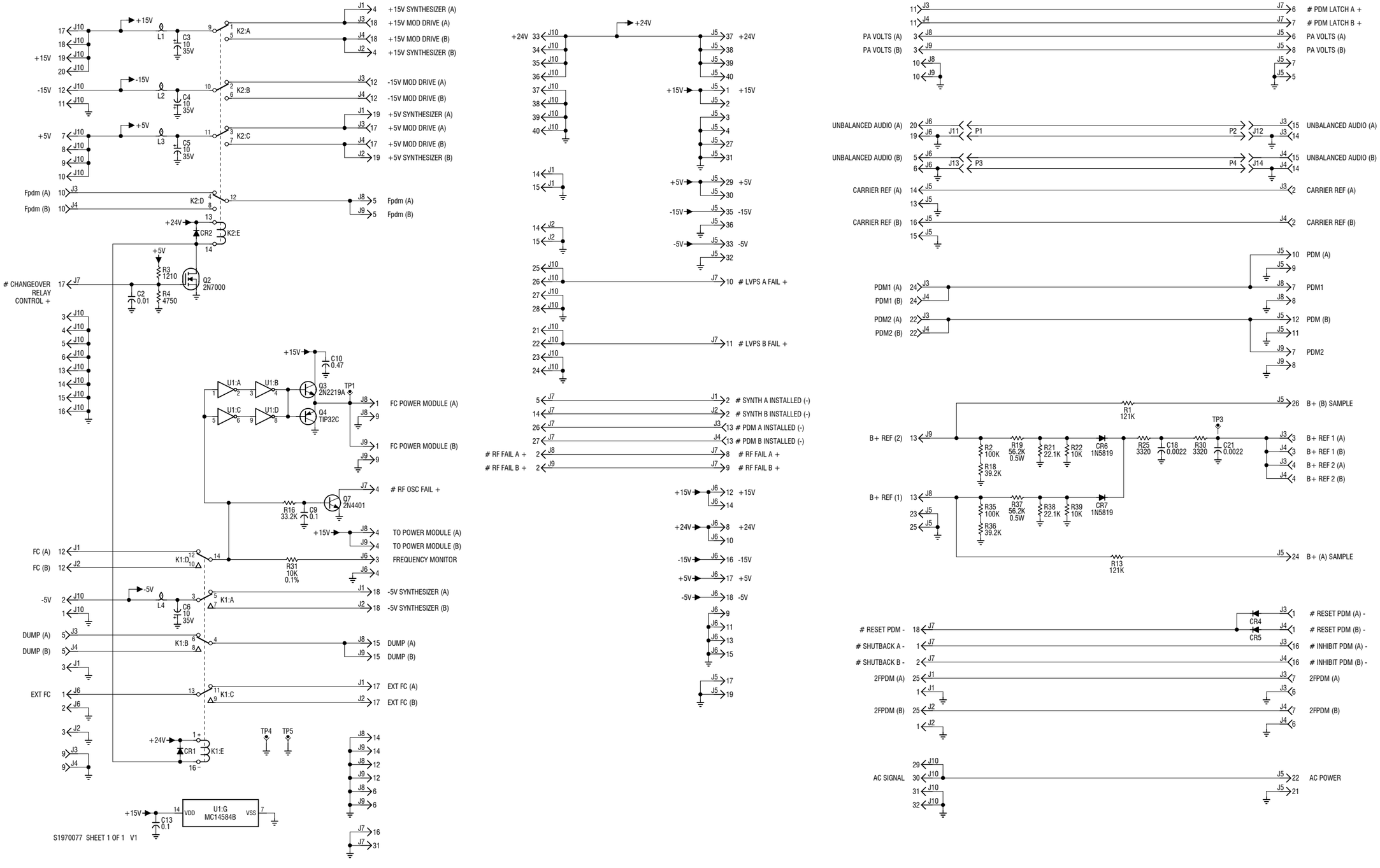
Electrical Schematic - Remote Interface PWB (NAPI85/01)			
Original Issue 3.0	Not to Scale	Figure SD-9	Sheet 2 of 3



S1970075 SHEET 3 OF 3 V2

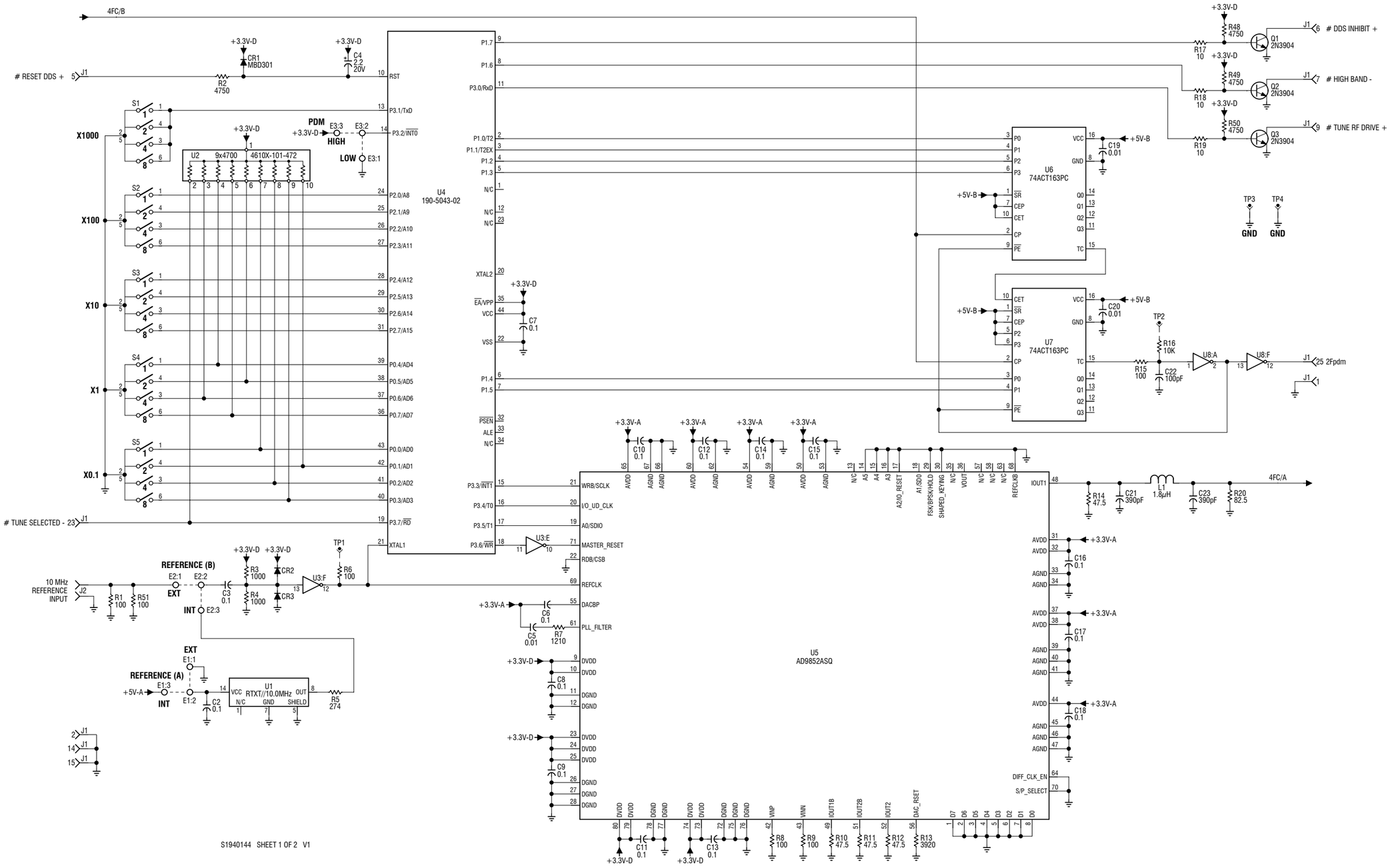
Dimensions = mm (inches)

Electrical Schematic - Remote Interface PWB (NAPI85/01)			
Original Issue 3.0	Not to Scale	Figure SD-10	Sheet 3 of 3



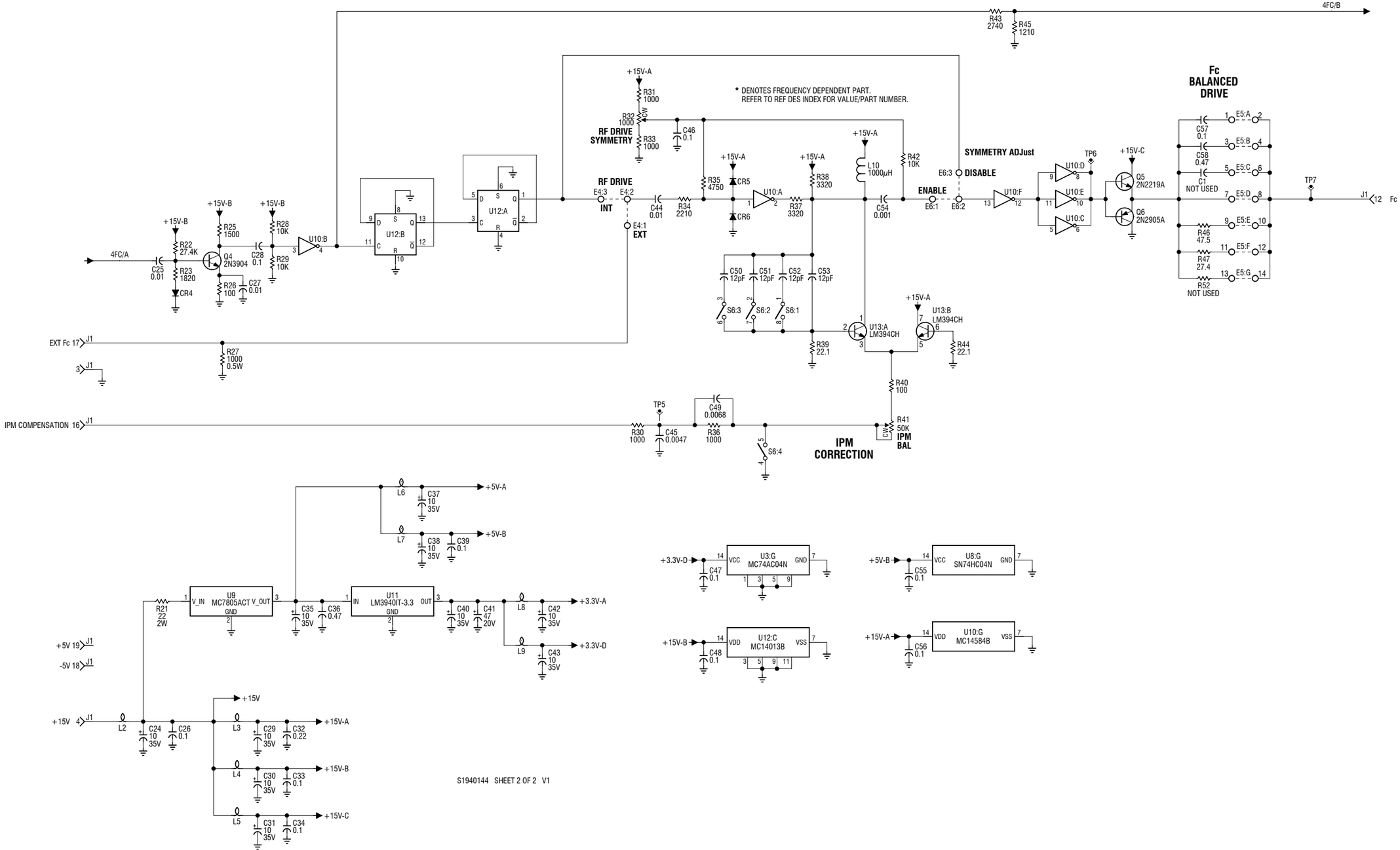
Dimensions = mm (inches)

Electrical Schematic - Exciter Interface PWB (NAPI87/01)			
Original Issue 3.0	Not to Scale	Figure SD-11	Sheet 1 of 1



Dimensions = mm (inches)

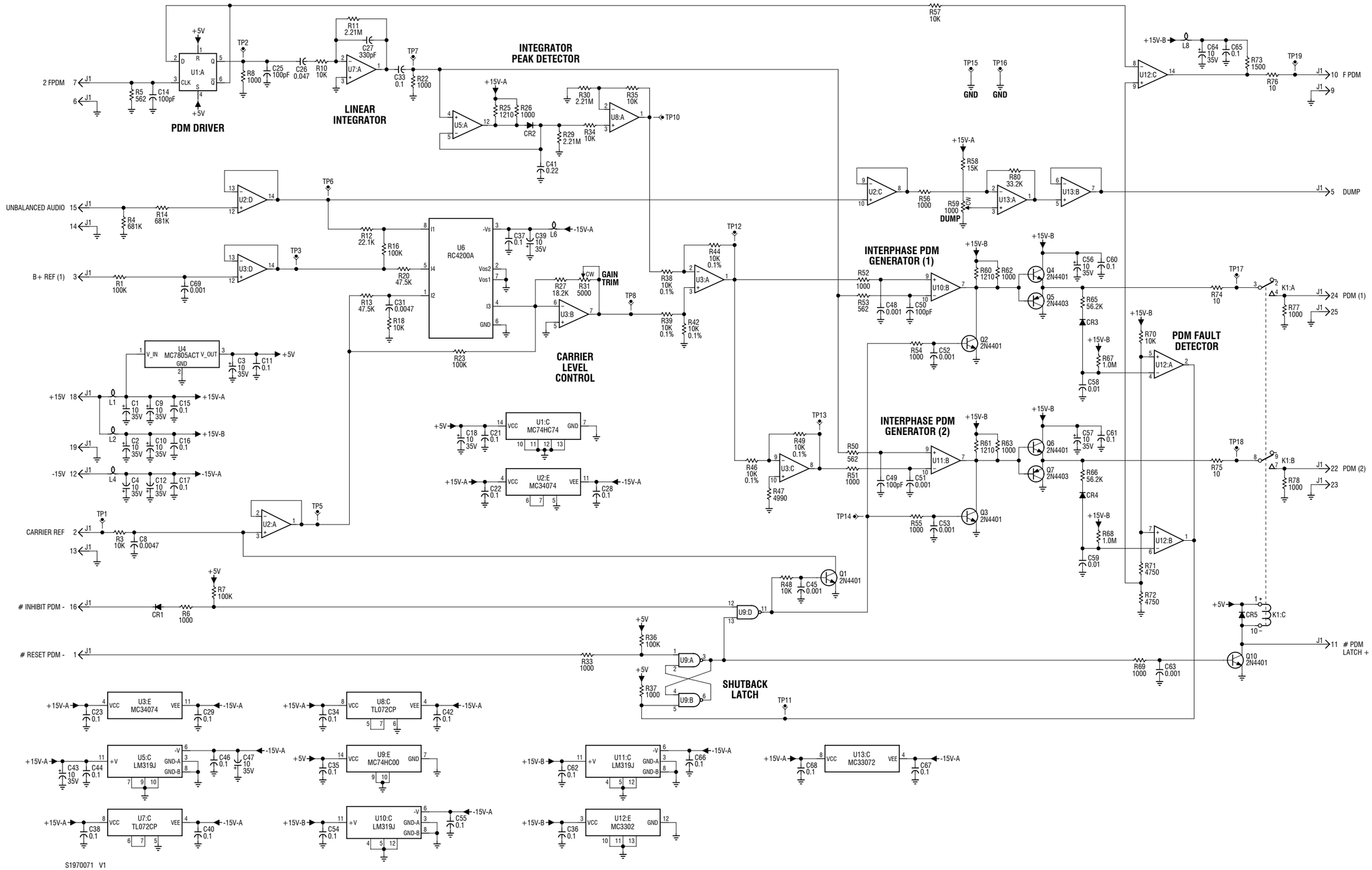
Electrical Schematic - RF Synthesizer PWB (NAPE70B)			
Original Issue 3.0	Not to Scale	Figure SD-12	Sheet 1 of 2



S1940144 SHEET 2 OF 2 V1

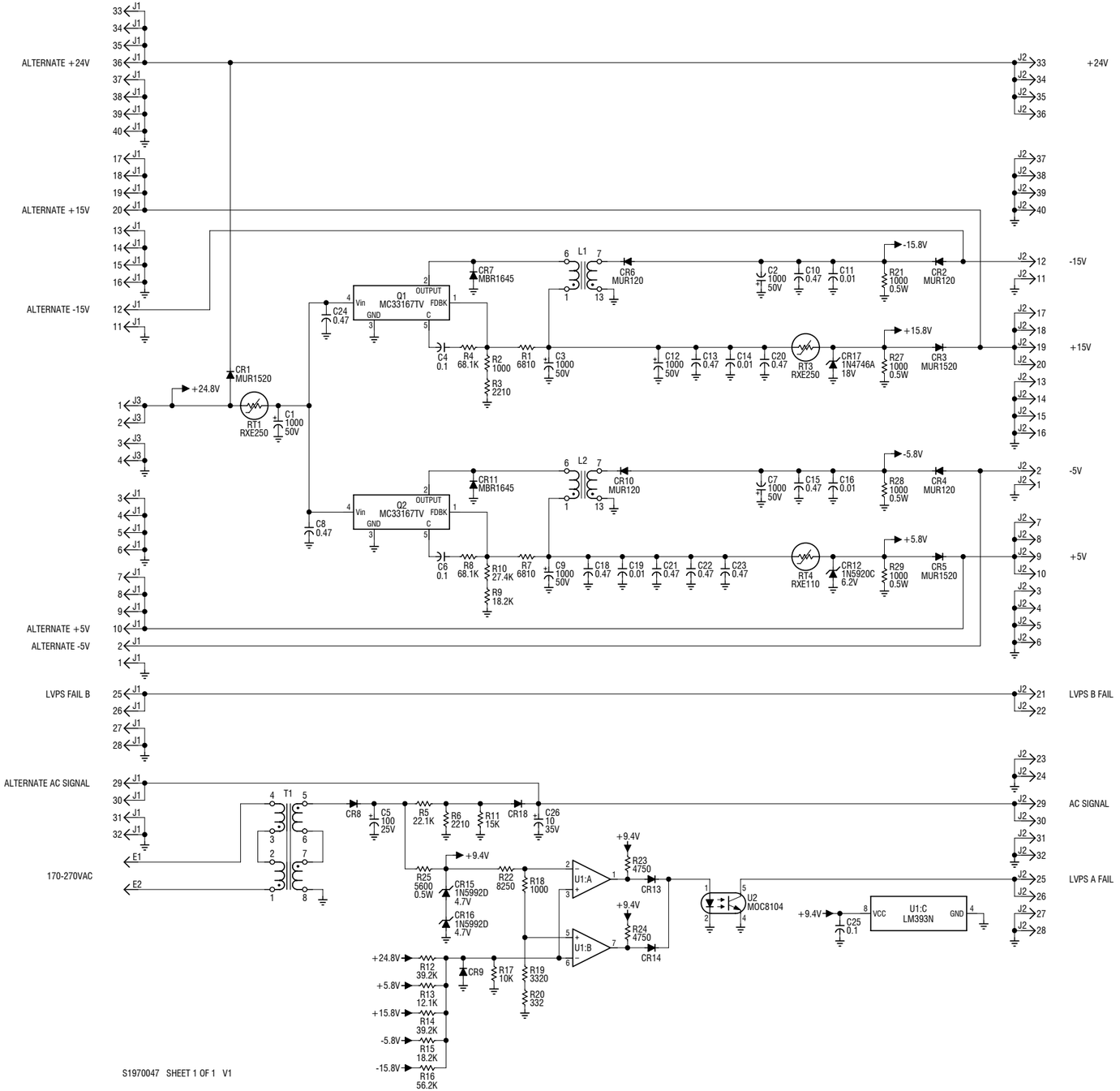
Dimensions = mm (inches)

Electrical Schematic - RF Synthesizer PWB (NAPE70B)			
Original Issue 3.0	Not to Scale	Figure SD-13	Sheet 2 of 2



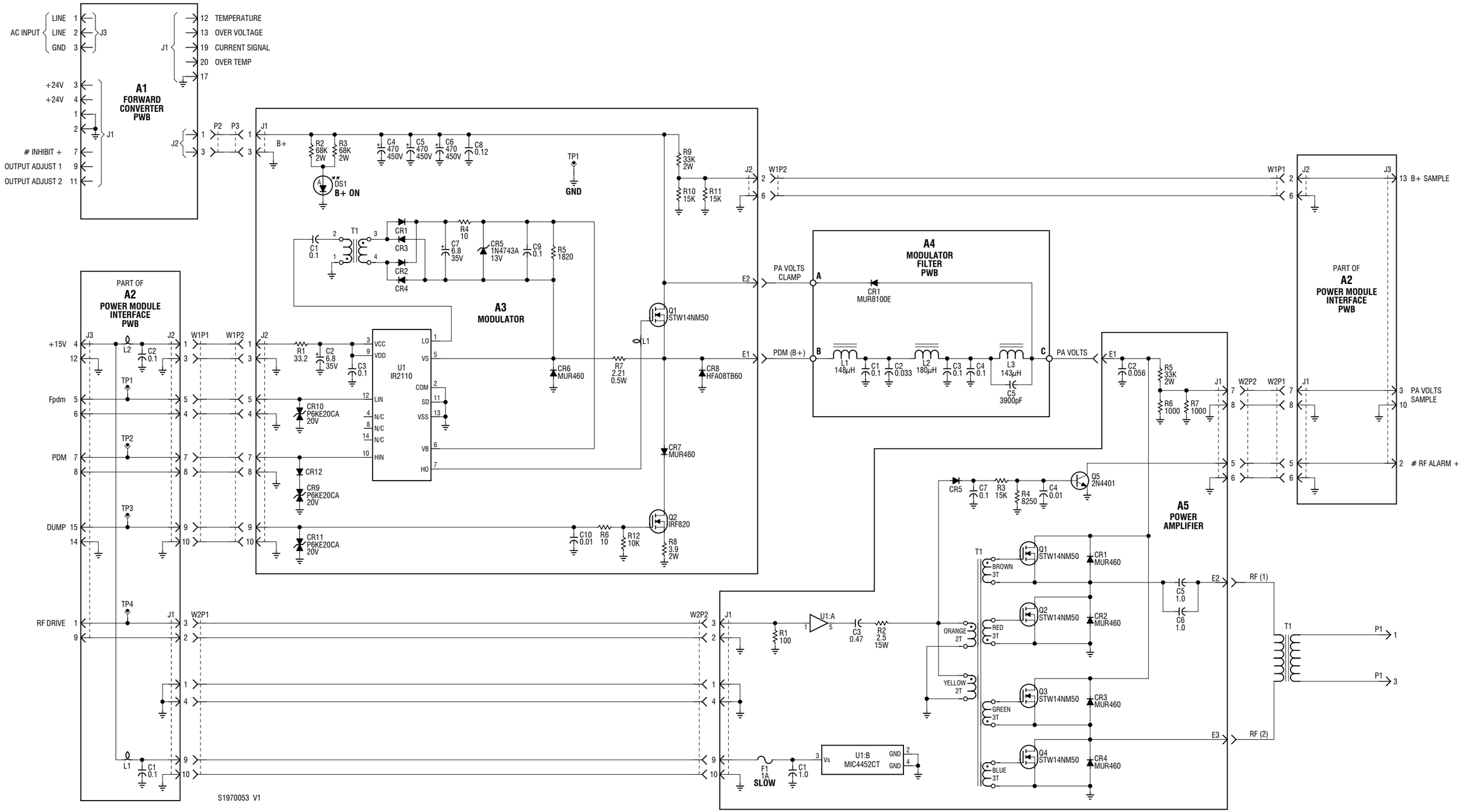
Dimensions = mm (inches)

Electrical Schematic - Interphase PDM Driver PWB (NAPM10A/01)			
Original Issue 3.0	Not to Scale	Figure SD-14	Sheet 1 of 1



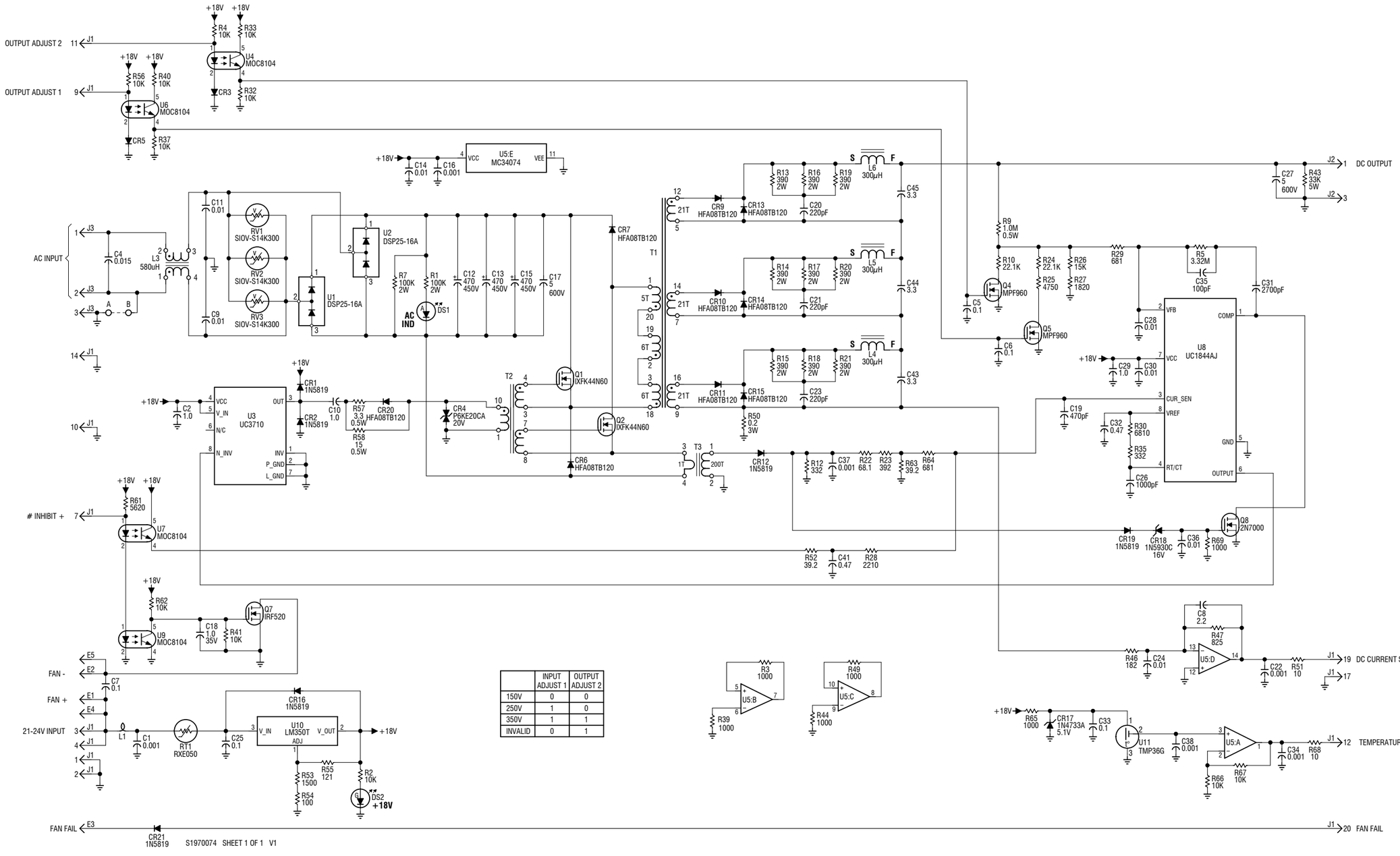
Dimensions = mm (inches)

Electrical Schematic - LVPS Buck Converter PWB (NAPS28A)			
Original Issue 3.0	Not to Scale	Figure SD-15	Sheet 1 of 1



Dimensions = mm (inches)

Electrical Schematic - RF Power Module (NAP31/02)			
Original Issue 3.0	Not to Scale	Figure SD-16	Sheet 1 of 1



	INPUT ADJUST 1	OUTPUT ADJUST 2
150V	0	0
250V	1	0
350V	1	1
INVALID	0	1

Dimensions = mm (inches)

Electrical Schematic - Forward Converter PWB (NAPS31A/03)			
Original Issue 3.0	Not to Scale	Figure SD-17	Sheet 1 of 1

J1000
REPAIR MANUAL

Section 7 MECHANICAL DRAWINGS

7.1 INTRODUCTION

This section contains mechanical drawings for assemblies of the subject equipment. Dimensional drawings may be included. Refer to Table 7-1 for an itemized list. Assembly detail drawings for assemblies/ modules that have separate maintenance manuals are not included. Refer to the appropriate maintenance manual for the assembly detail of these assemblies.

7.2 LOCATING ASSEMBLY DETAIL DRAWINGS

Each illustration in this section is identified by a number that is both the figure number and the page number. The numbers are assigned sequentially and are prefixed by the letters 'MD-'. Drawings in this section are listed in Table 7-1.

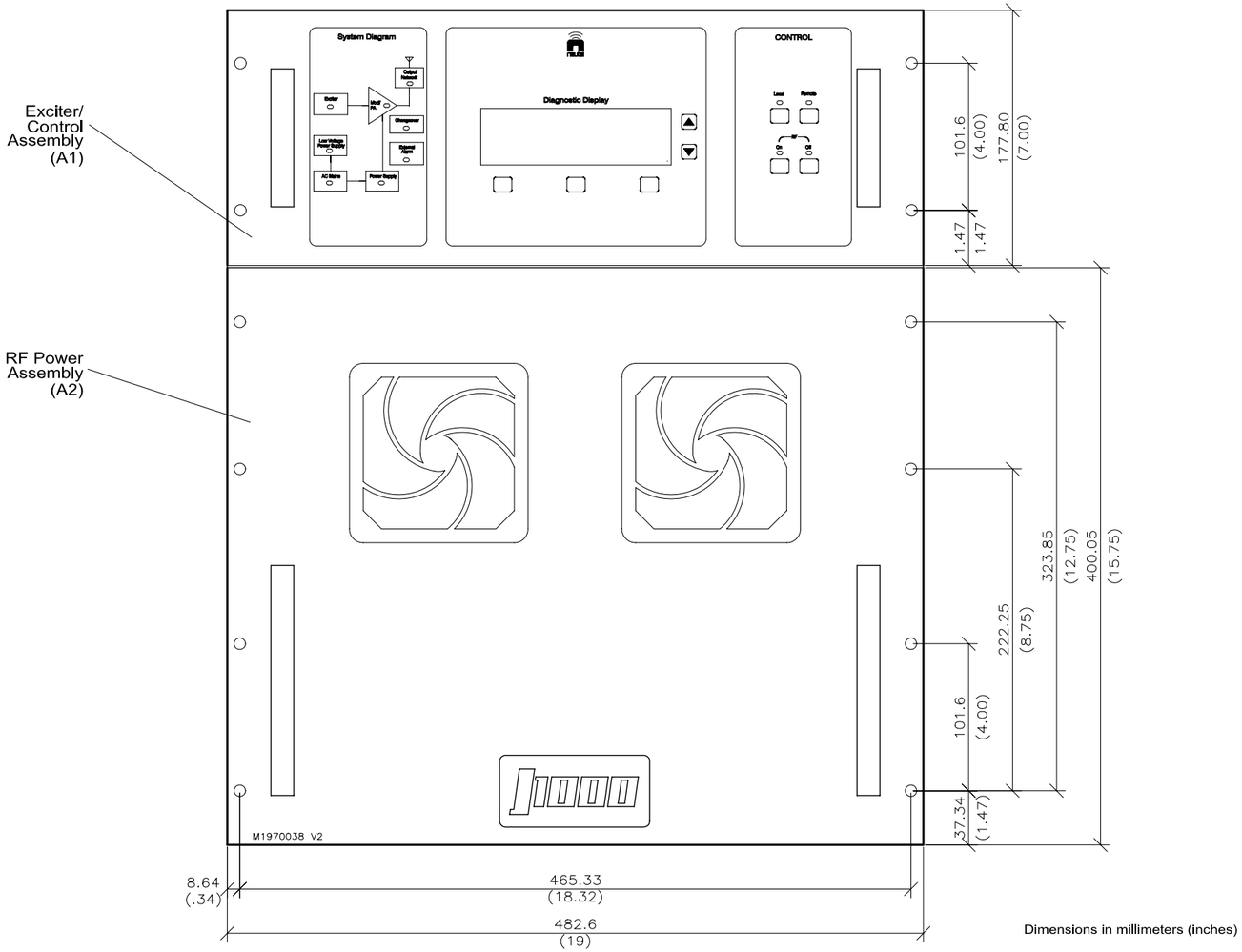
7.3 CONTENT OF MECHANICAL DRAWINGS

Mechanical drawings are illustrations that depict the location of electrical components and show assembly outline detail. Dimensional information is included, where appropriate.

When a module/assembly is the subject of its own assembly detail drawing and it is also shown in a higher level assembly, the detail depicted in the higher level assembly may have minor differences from the module/ assembly actually installed. In this case, always refer to the assembly detail drawing of the module/assembly for detailed information.

Table 7-1: Mechanical Drawings

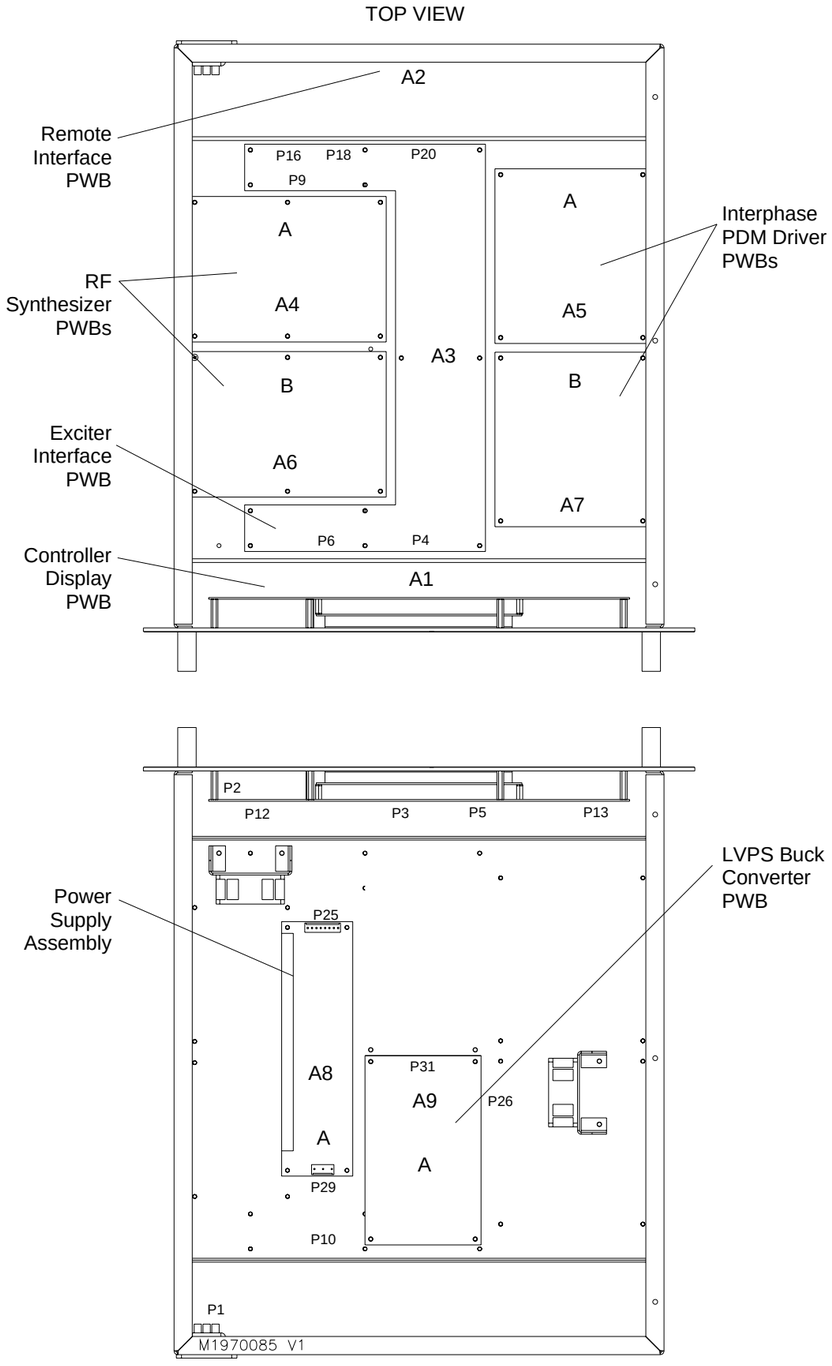
Figure #	Description
MD-1	Assembly Detail/Dimensional Information - J1000 1000 Watt AM Broadcast Transmitter
MD-2	Assembly Detail – NAE88A/01 Exciter/Control Assembly
MD-3	Assembly Detail – NAPC143A/01 Controller/Display PWB
MD-4	Assembly Detail – NAPI85/01 Remote Interface PWB
MD-5	Assembly Detail – NAPI87/01 Exciter Interface PWB
MD-6	Assembly Detail – NAPE70B RF Synthesizer PWB
MD-7	Assembly Detail – NAPM10A/01 Interphase PDM Driver PWB
MD-8	Assembly Detail - NAPS28A LVPS Buck Converter PWB
MD-9	Assembly Detail - NARA39A/01 RF Power Assembly
MD-10	Assembly Detail - NAP31/02 RF Power Module
MD-11	Assembly Detail – NAPS31A/03 Forward Converter PWB
MD-12	Assembly Detail - NAPI73 Power Module Interface PWB
MD-13	Assembly Detail – NASM11A/02 Modulator
MD-14	Assembly Detail - NAPF08 Modulator Filter PWB
MD-15	Assembly Detail - NAAA05/02 Power Amplifier
MD-16	Assembly Detail - NAPF03A/01 RF Filter Input PWB
MD-17	Assembly Detail – NAPF07A/02 Forward/Reflected Power Probe



Dimensions in millimeters (inches)

Dimensions = mm (inches)

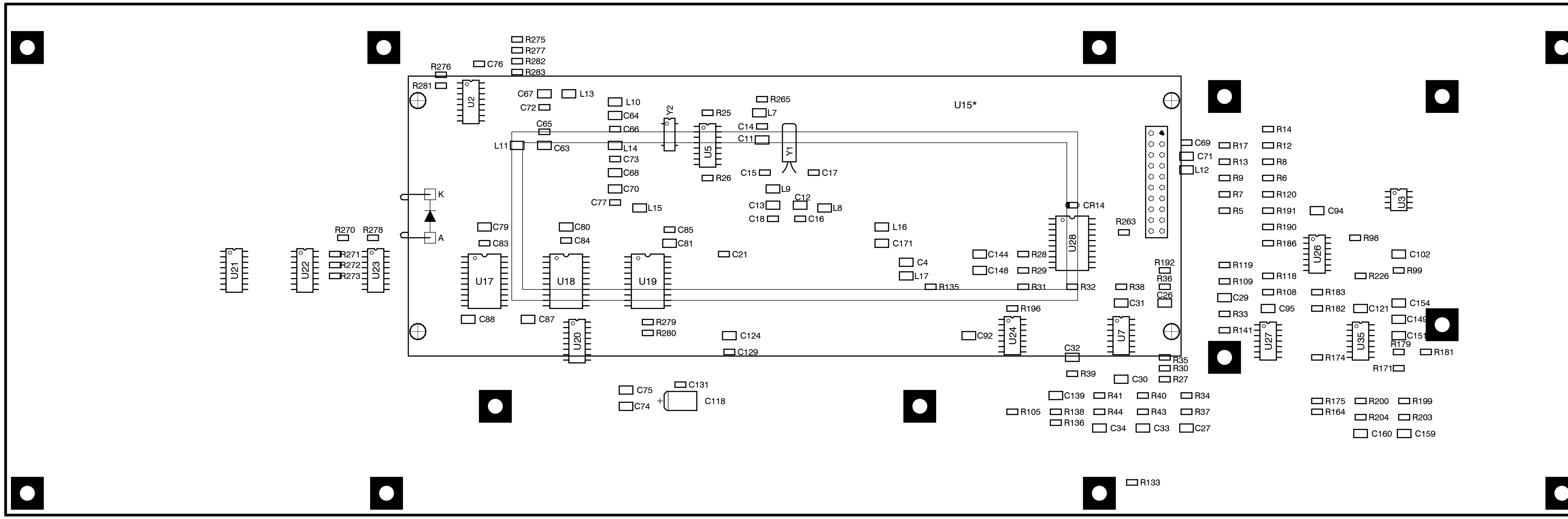
Assembly Detail/Dimensional Information - J1000 1000 Watt AM Broadcast Transmitter			
Original Issue 3.0	Not to Scale	Figure MD-1	Sheet 1 of 1



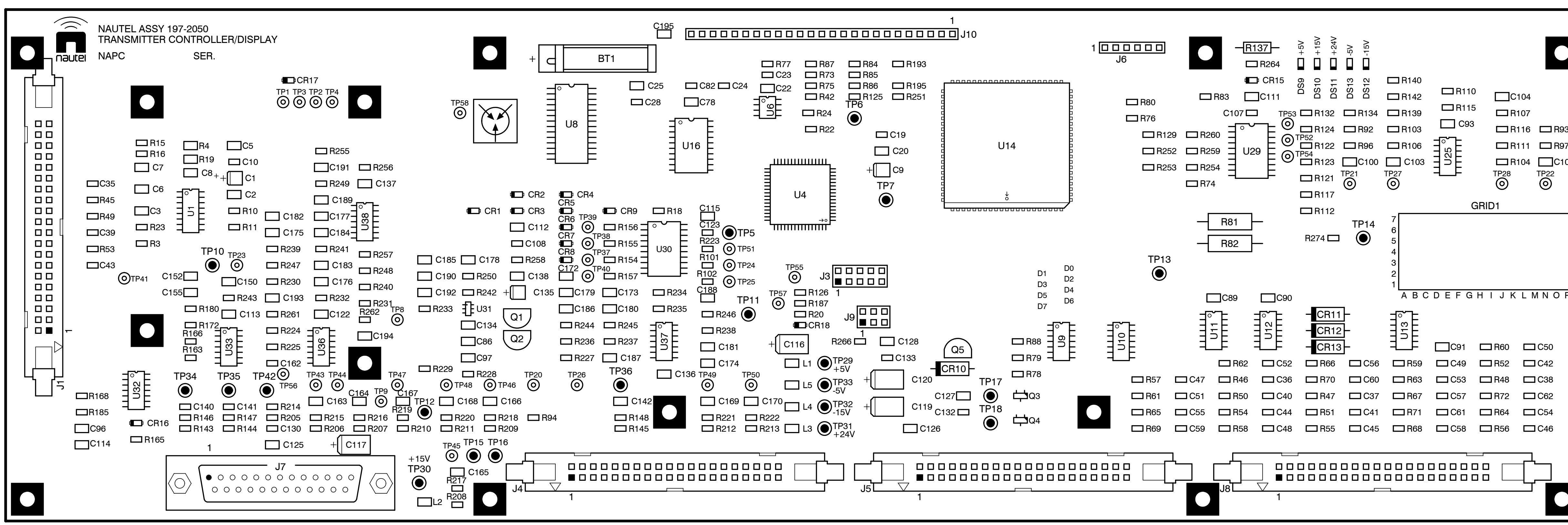
Dimensions = mm (inches)

Assembly Detail - NAE88A/01 Exciter/Control Assembly			
Original Issue 3.0	Not to Scale	Figure MD-2	Sheet 1 of 1

* DENOTES DISPLAY U15 DRAWN TRANSPARENT
TO SHOW PARTS INSTALLED BEHIND.



REAR

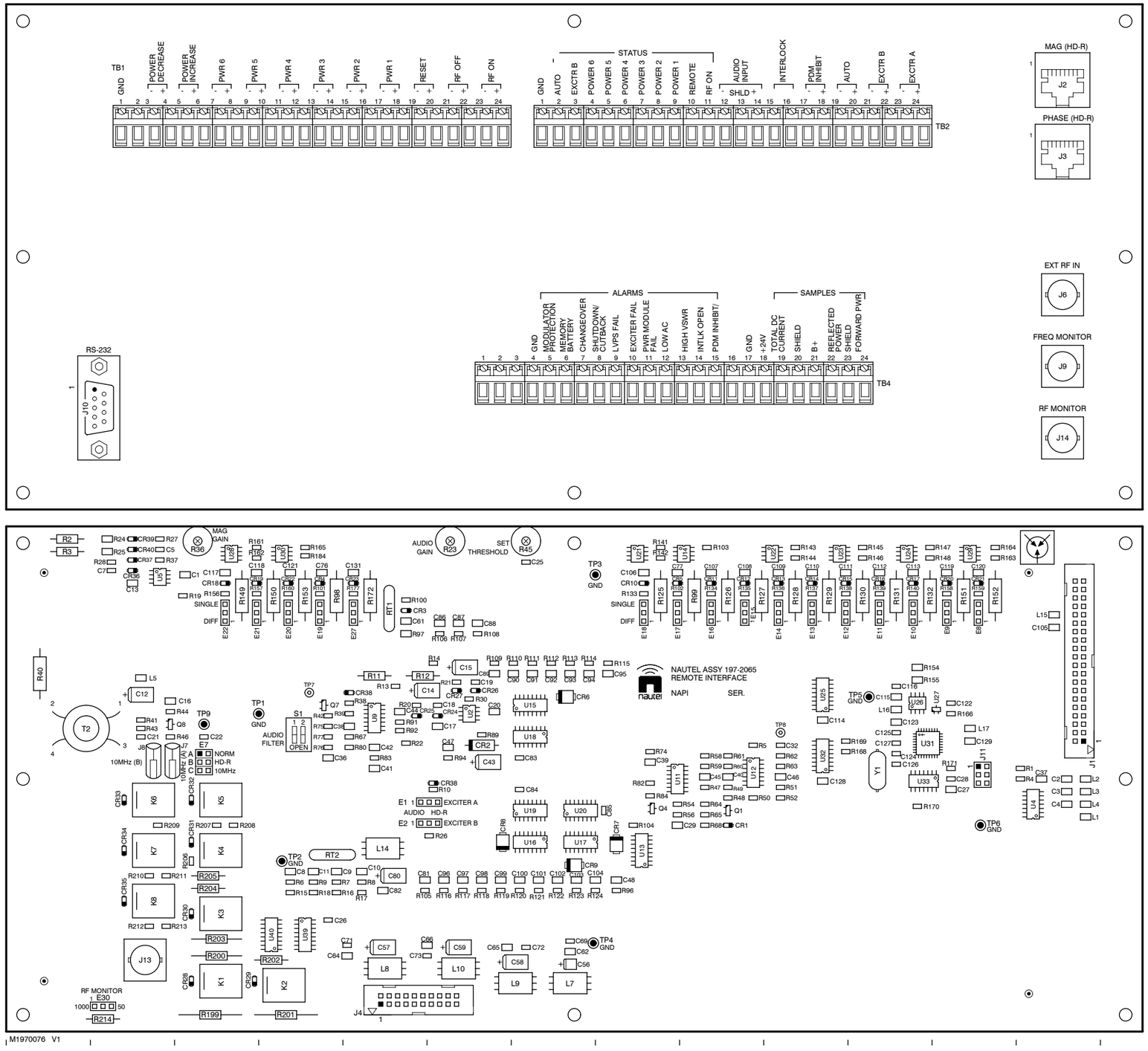


FRONT

M1970023 V1

Dimensions = mm (inches)

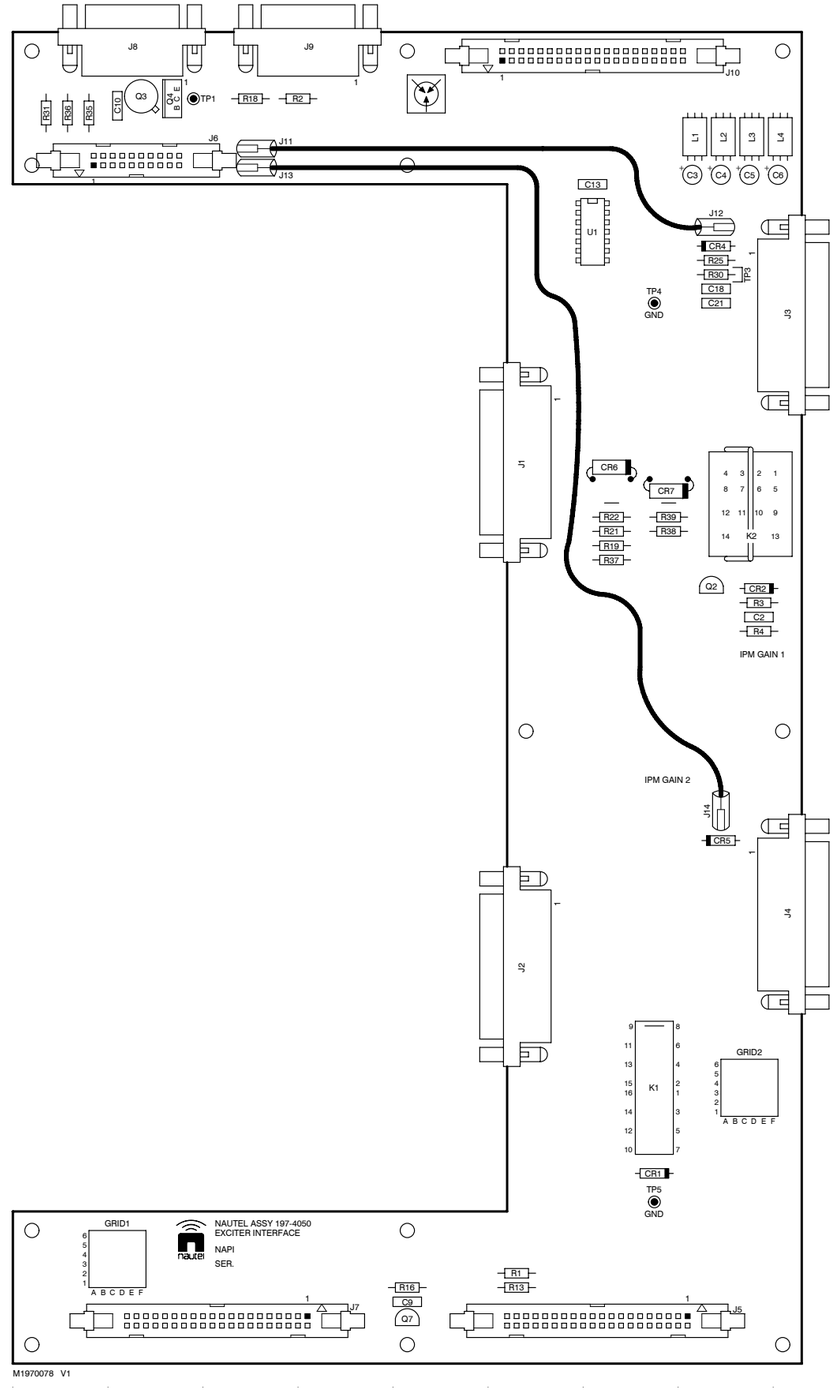
Assembly Detail - NAPC143A/01 Controller/Display PWB			
Original Issue 3.0	Not to Scale	Figure MD-3	Sheet 1 of 1



FRONT SIDE

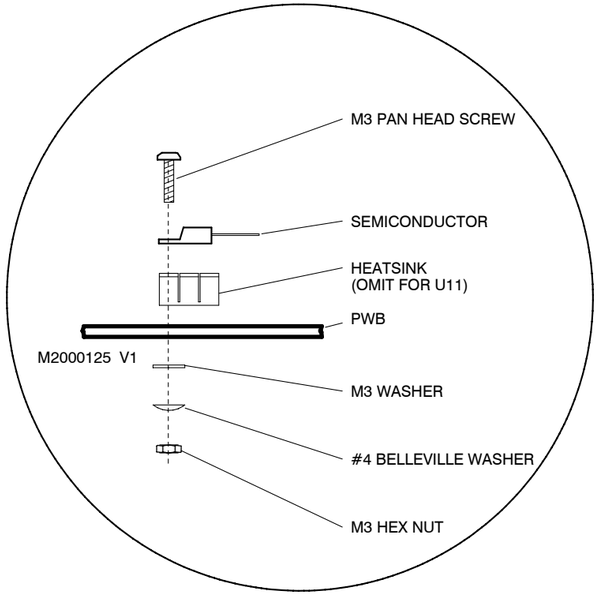
Dimensions = mm (inches)

Assembly Detail – NAPI85/01 Remote Interface PWB			
Original Issue 3.0	Not to Scale	Figure MD-4	Sheet 1 of 1



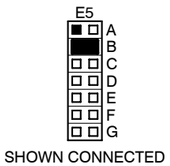
Dimensions = mm (inches)

Assembly Detail – NAPI87/01 Exciter Interface PWB			
Original Issue 3.0	Not to Scale	Figure MD-5	Sheet 1 of 1

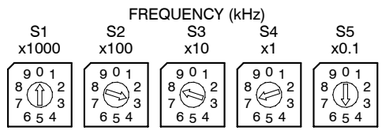


U9 & U11 MOUNTING DETAIL

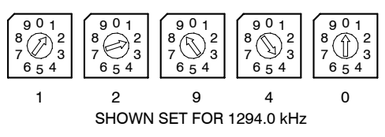
TORQUE ATACHING HARDWARE TO
4.0 INCH POUNDS (0.45 NEWTON METERS)



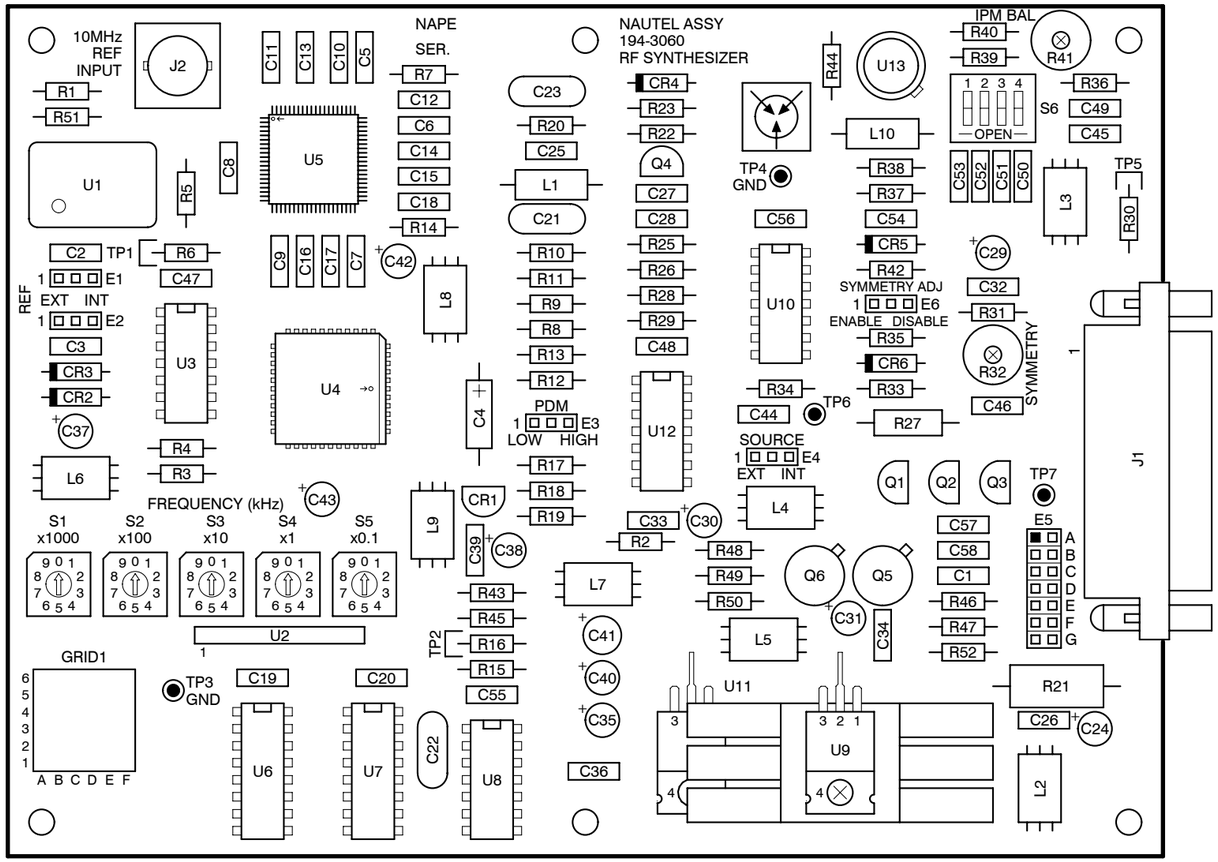
SHOWN CONNECTED
IN 'B' POSITION



SHOWN SET FOR 387.5 kHz



SHOWN SET FOR 1294.0 kHz

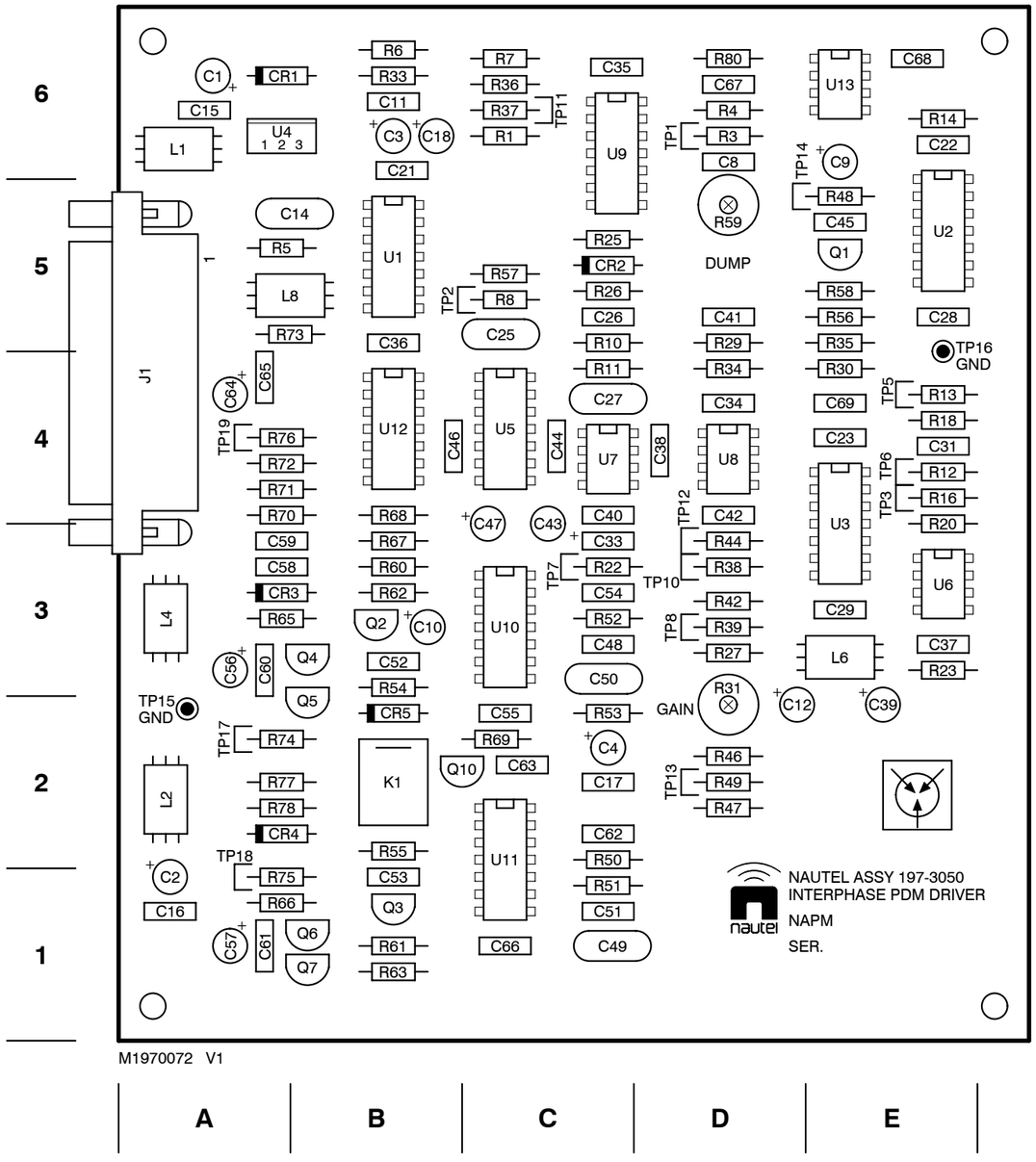


M1940145 V1

A	B	C	D	E	F	G

Dimensions = mm (inches)

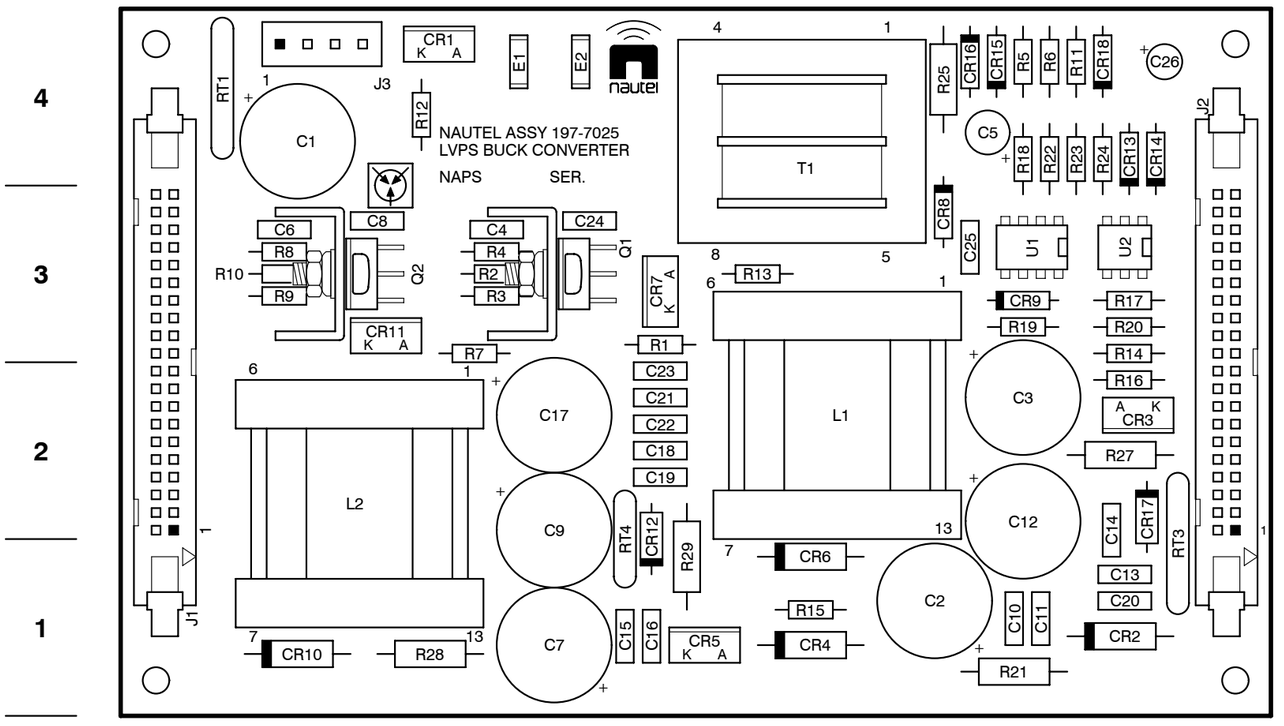
Assembly Detail - NAPE70B RF Synthesizer PWB			
Original Issue 3.0	Not to Scale	Figure MD-6	Sheet 1 of 1



M1970072 V1

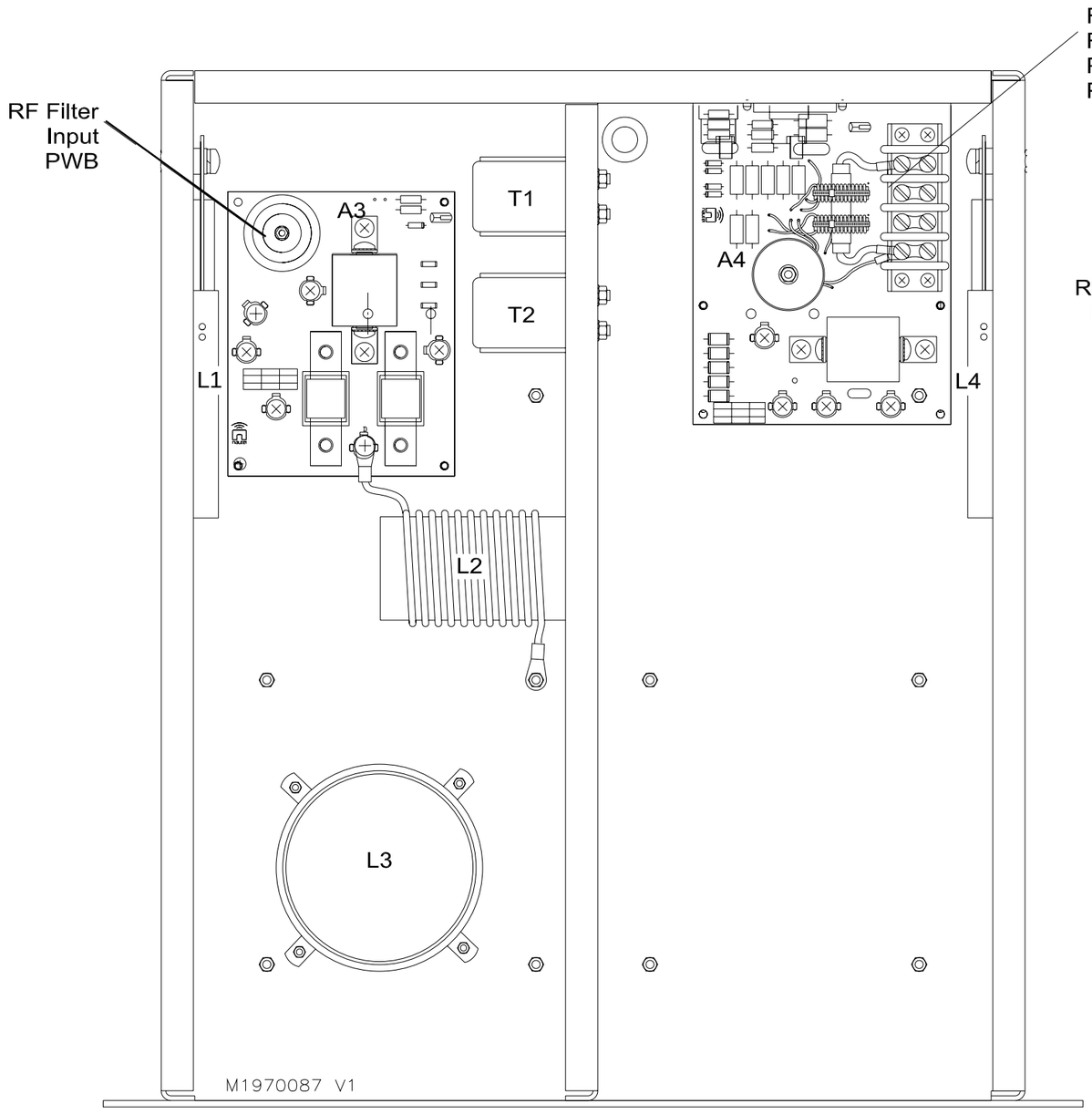
Dimensions = mm (inches)

Assembly Detail – NAPM10A/01 Interphase PDM Driver PWB			
Original Issue 3.0	Not to Scale	Figure MD-7	Sheet 1 of 1

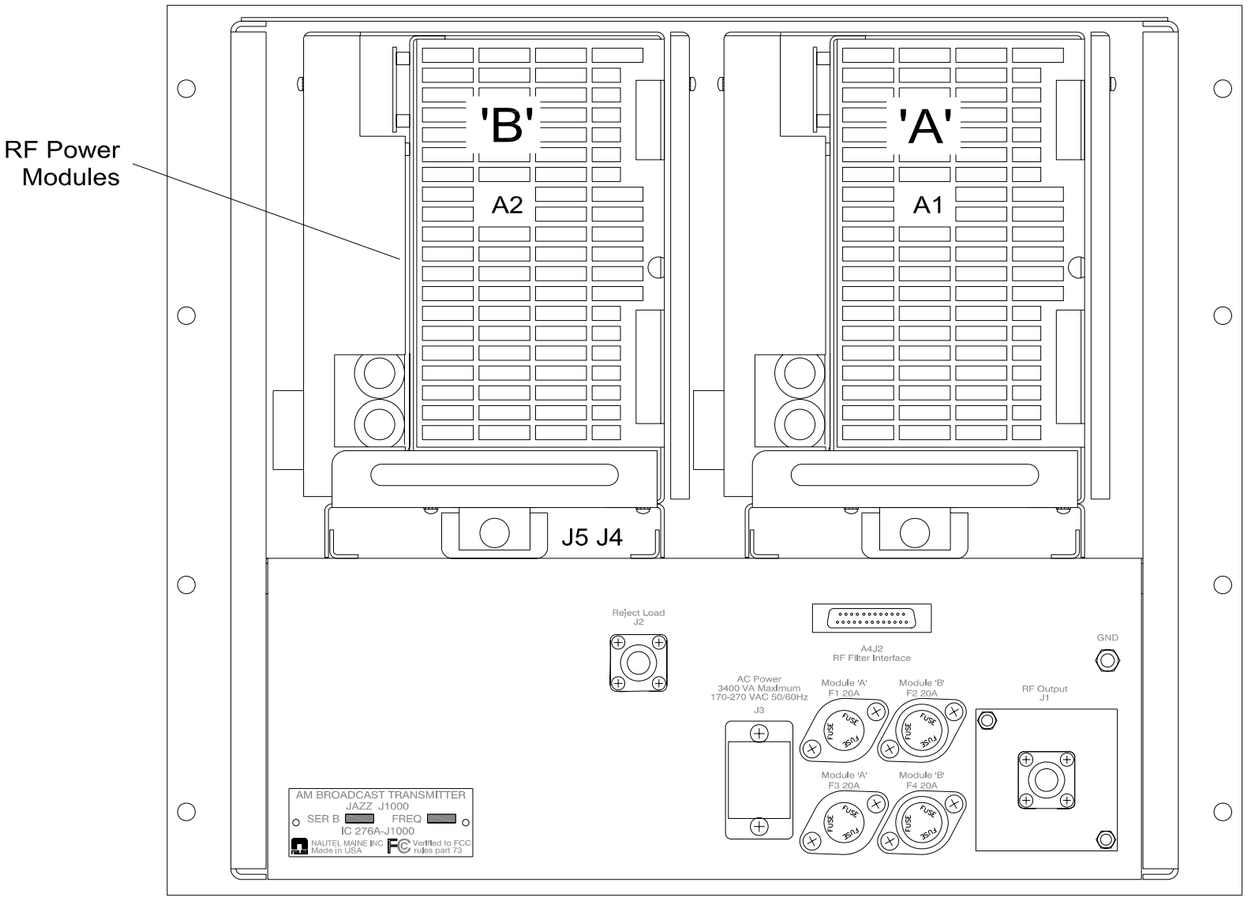


Dimensions = mm (inches)

Assembly Detail - NAPS28A LVPS Buck Converter PWB			
Original Issue 3.0	Not to Scale	Figure MD-8	Sheet 1 of 1



BOTTOM VIEW

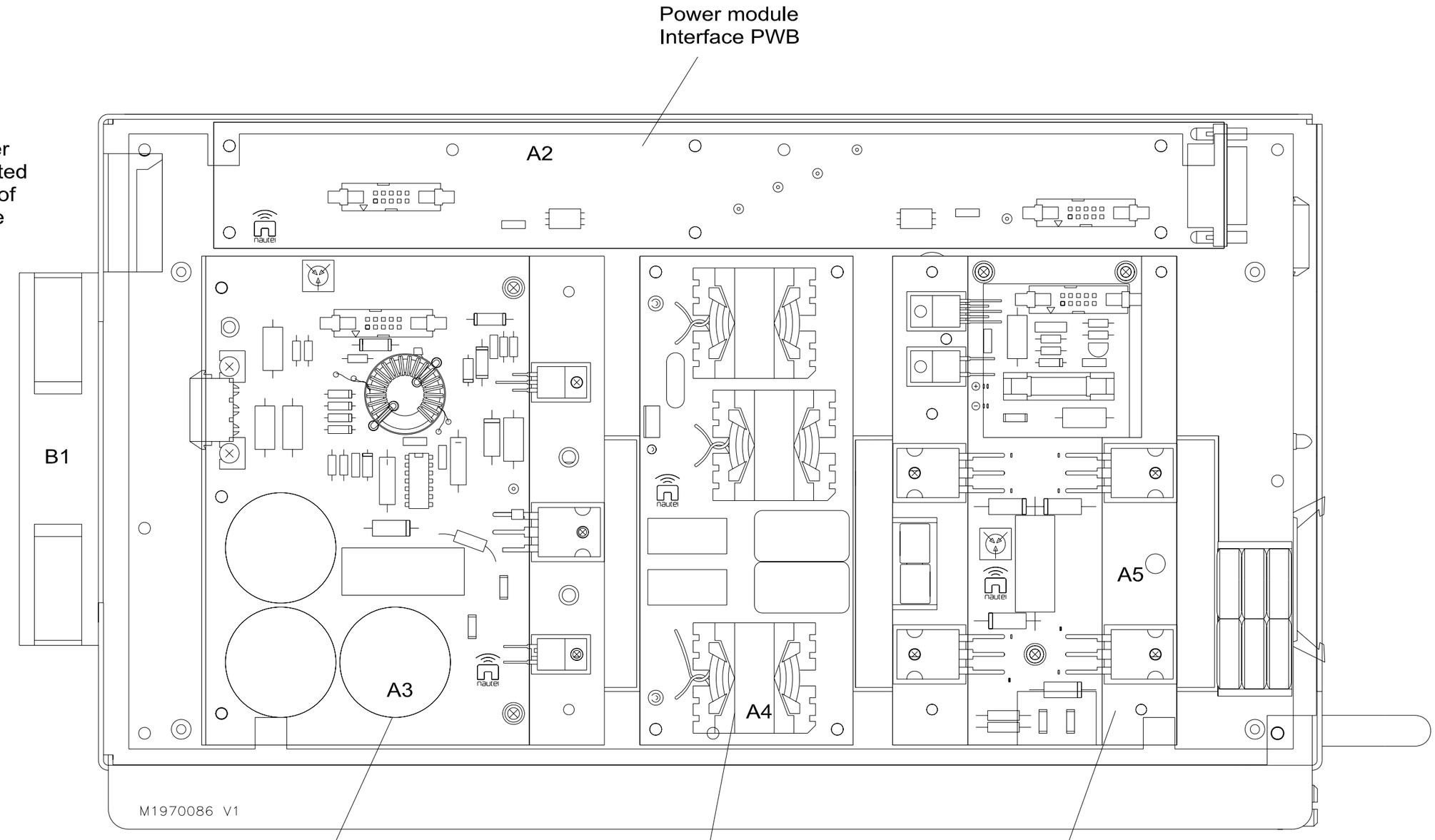


REAR VIEW

Dimensions = mm (inches)

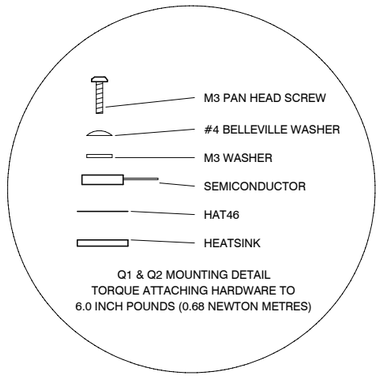
Assembly Detail - NARA39A/01 RF Power Assembly			
Original Issue 3.0	Not to Scale	Figure MD-9	Sheet 1 of 1

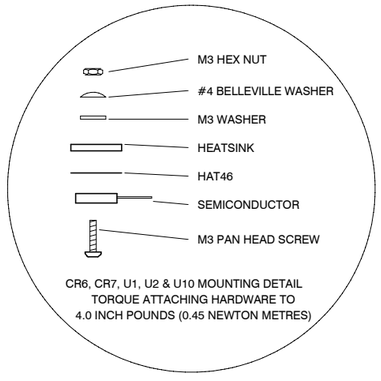
Forward converter PWB (A1) is located on opposite side of RF power module

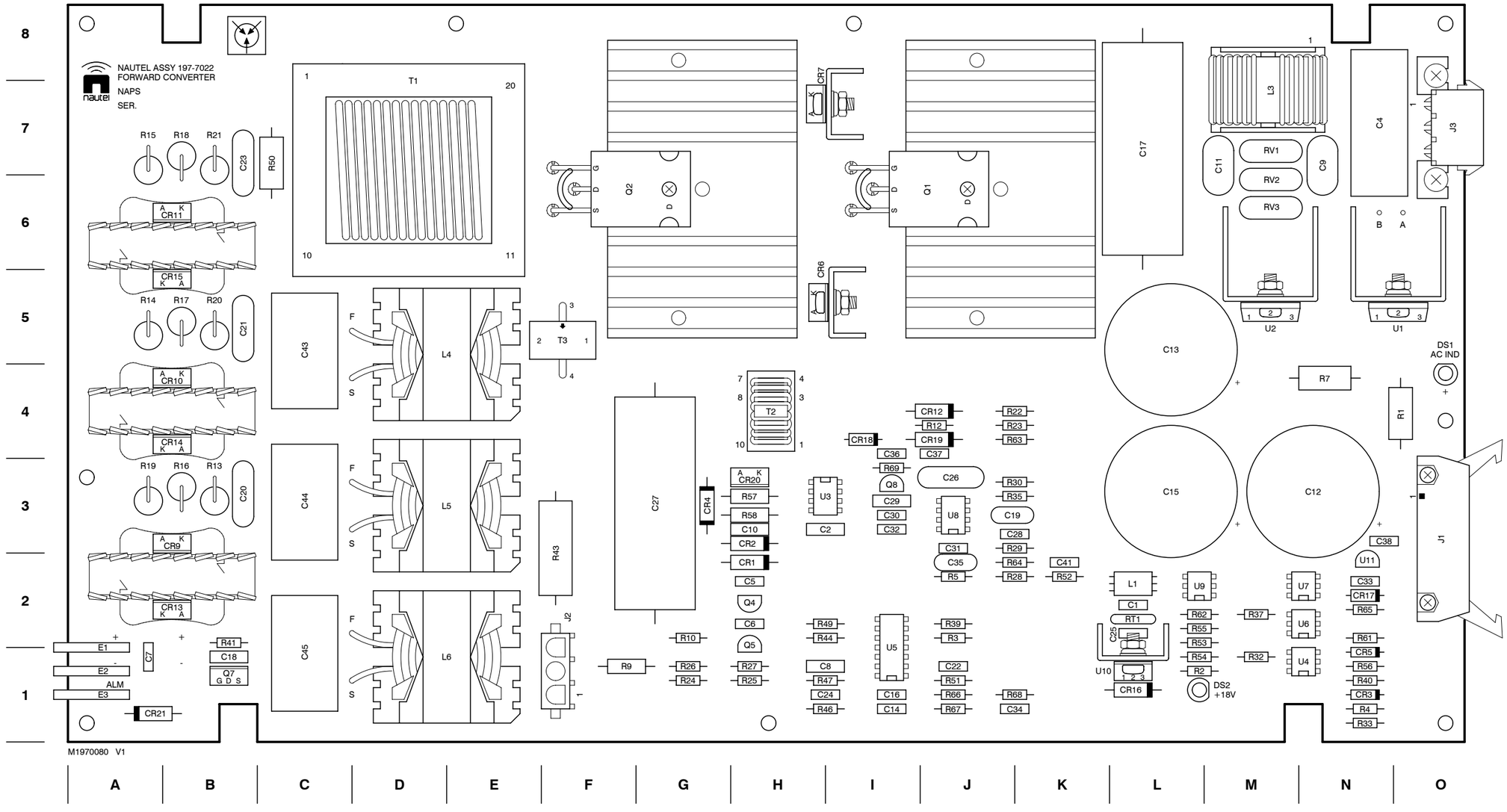


Dimensions = mm (inches)

Assembly Detail – NAP31/02 RF Power Module			
Original Issue 3.0	Not to Scale	Figure MD-10	Sheet 1 of 1

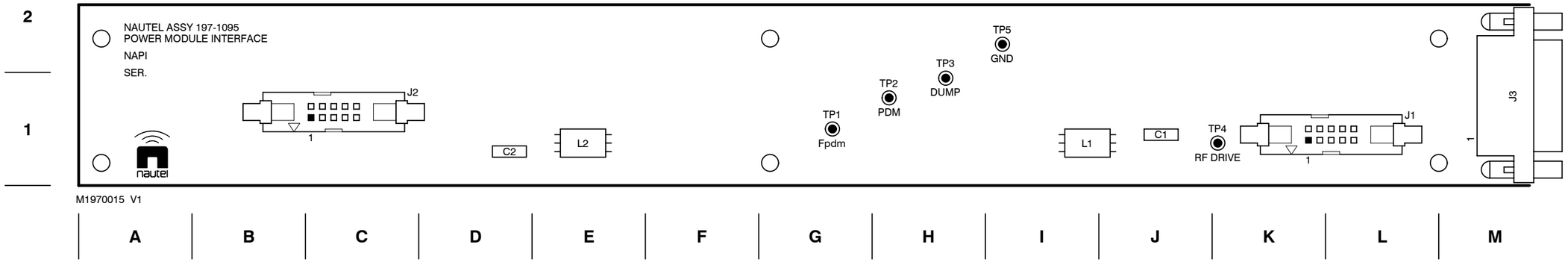






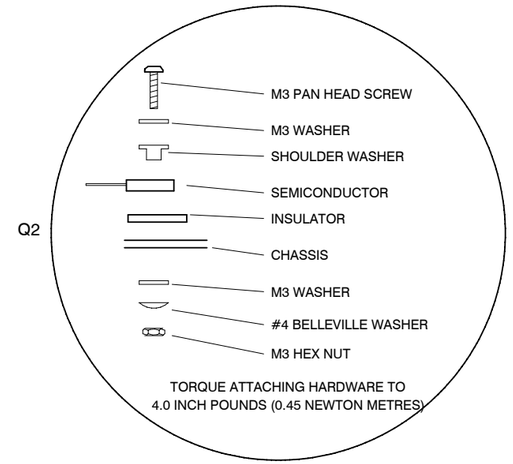
Dimensions = mm (inches)

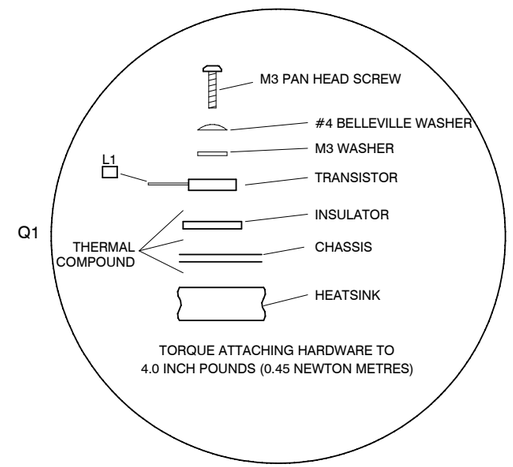
Assembly Detail – NAPS31A/03 Forward Converter PWB			
Original Issue 3.0	Not to Scale	Figure MD-11	Sheet 1 of 1

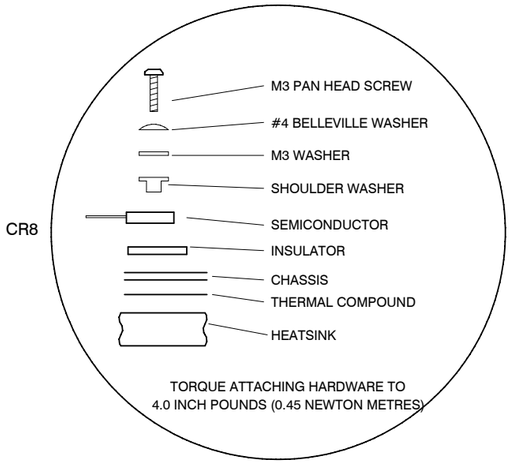


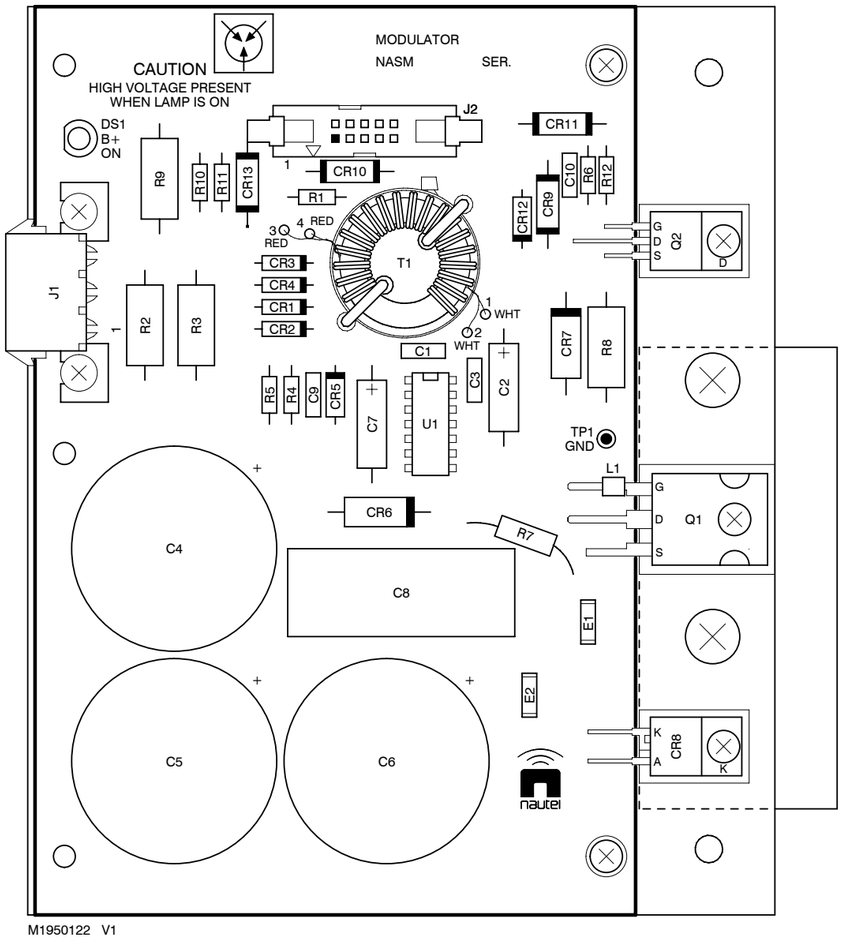
Dimensions = mm (inches)

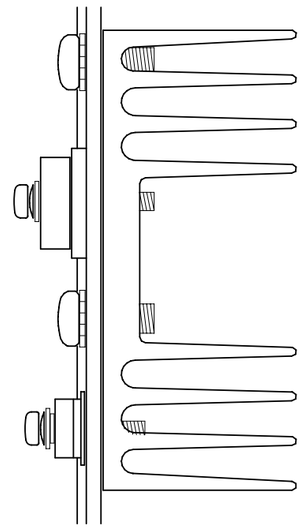
Assembly Detail - NAPI73 Power Module Interface PWB			
Original Issue 3.0	Not to Scale	Figure MD-12	Sheet 1 of 1





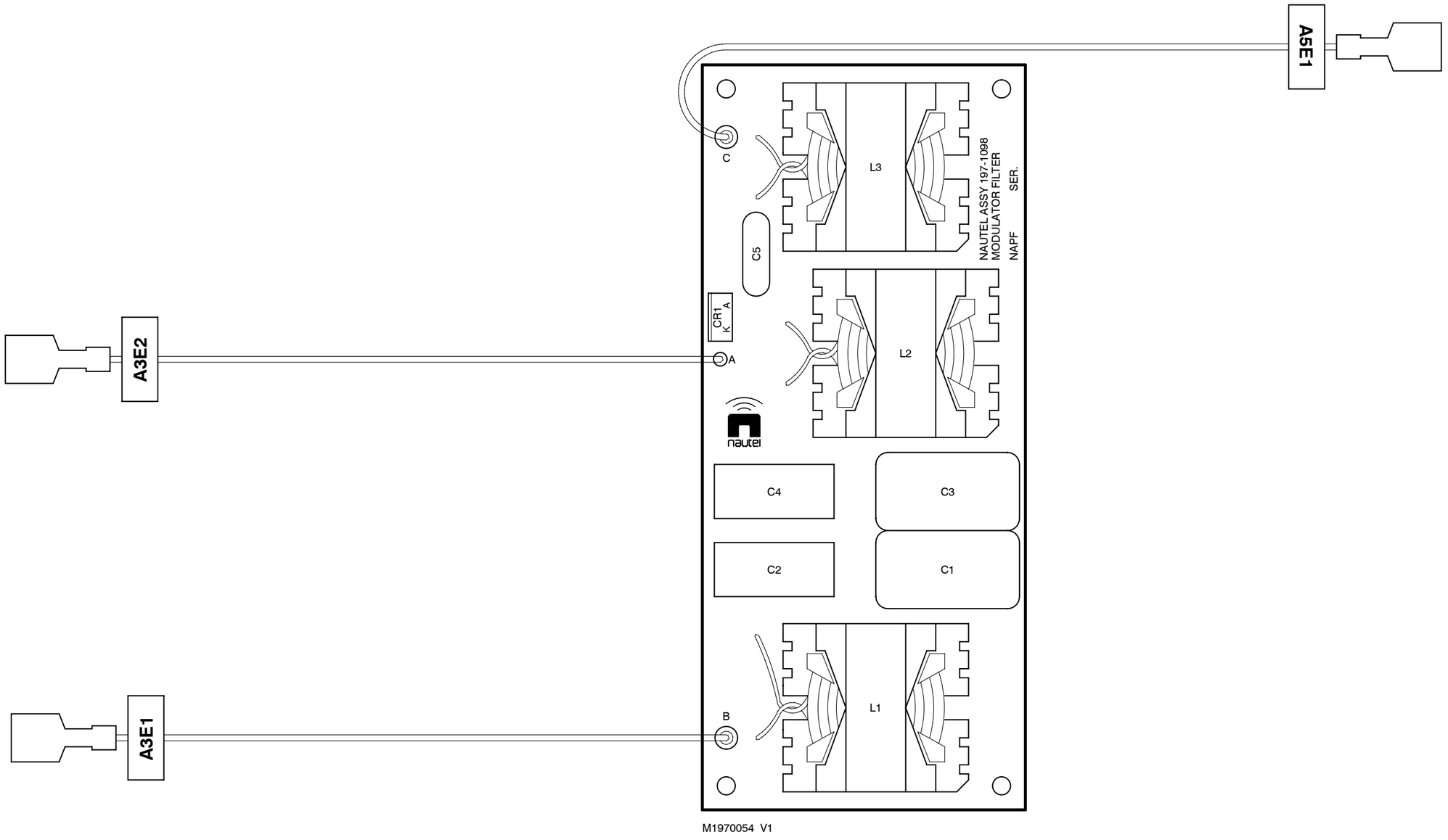






Dimensions = mm (inches)

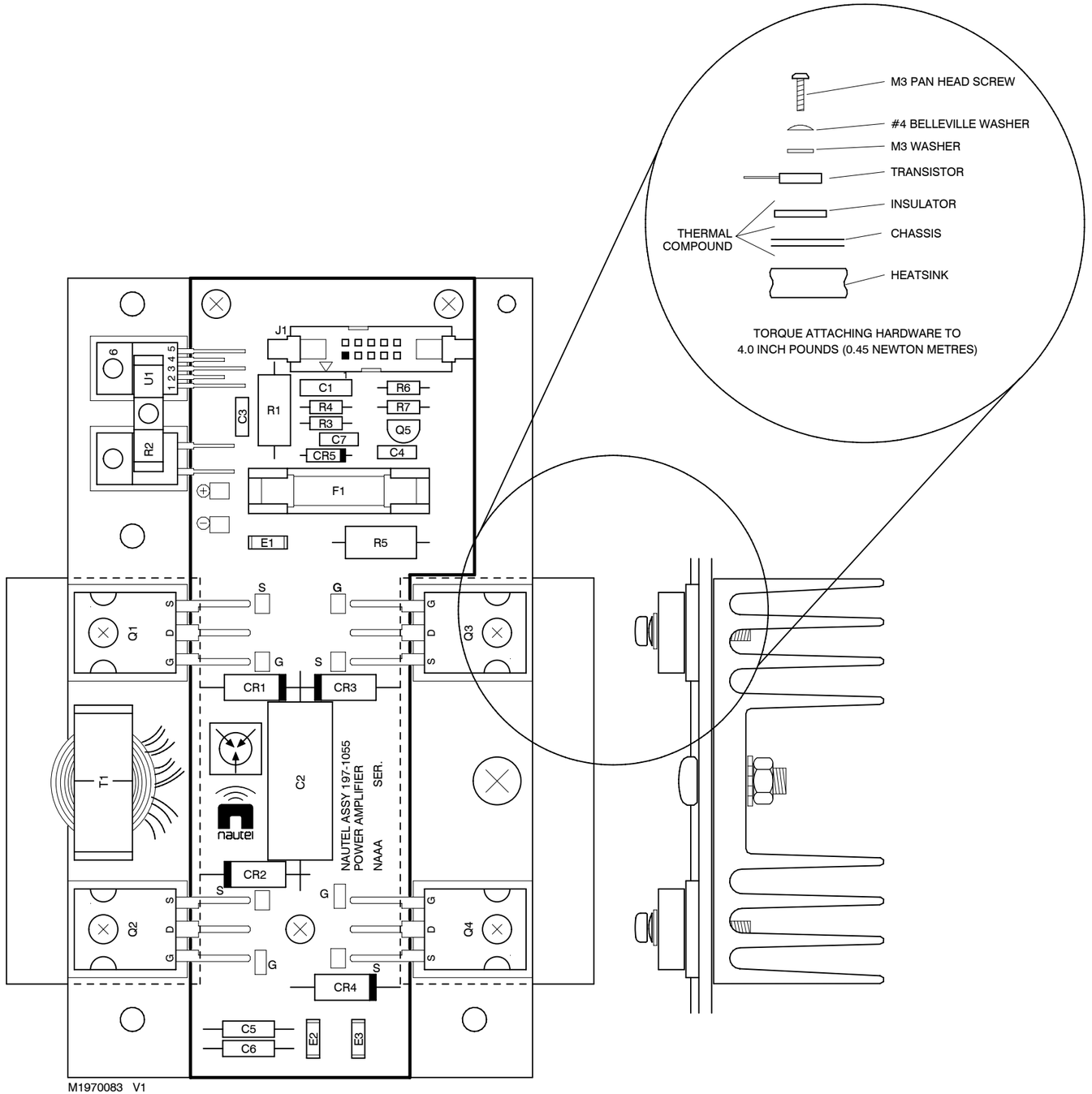
Assembly Detail – NASM11A/02 Modulator			
Original Issue 3.0	Not to Scale	Figure MD-13	Sheet 1 of 1



M1970054 V1

Dimensions = mm (inches)

Assembly Detail - NAPF08 Modulator Filter PWB			
Original Issue 3.0	Not to Scale	Figure MD-14	Sheet 1 of 1

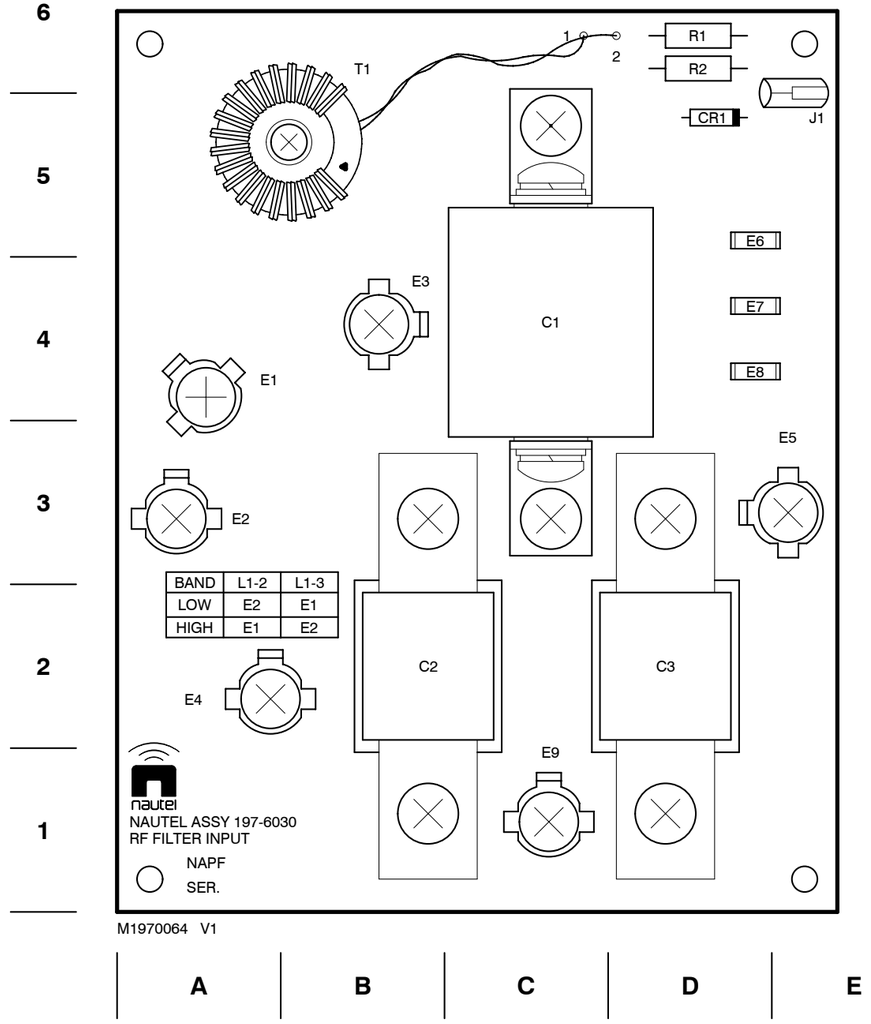


TRANSFORMER T1 CONNECTIONS. TWIST GROUPED WIRES TOGETHER

ORANGE	+ PAD NEAR R2
YELLOW	+ PAD NEAR R2
ORANGE/BLACK	- PAD NEAR R2
YELLOW/BLACK	- PAD NEAR R2
BROWN	Q1-GATE
BROWN/BLACK	Q1-SOURCE
RED	Q2-SOURCE
RED/BLACK	Q2-GATE
GREEN	Q3-SOURCE
GREEN/BLACK	Q3-GATE
BLUE	Q4-GATE
BLUE/BLACK	Q4-SOURCE

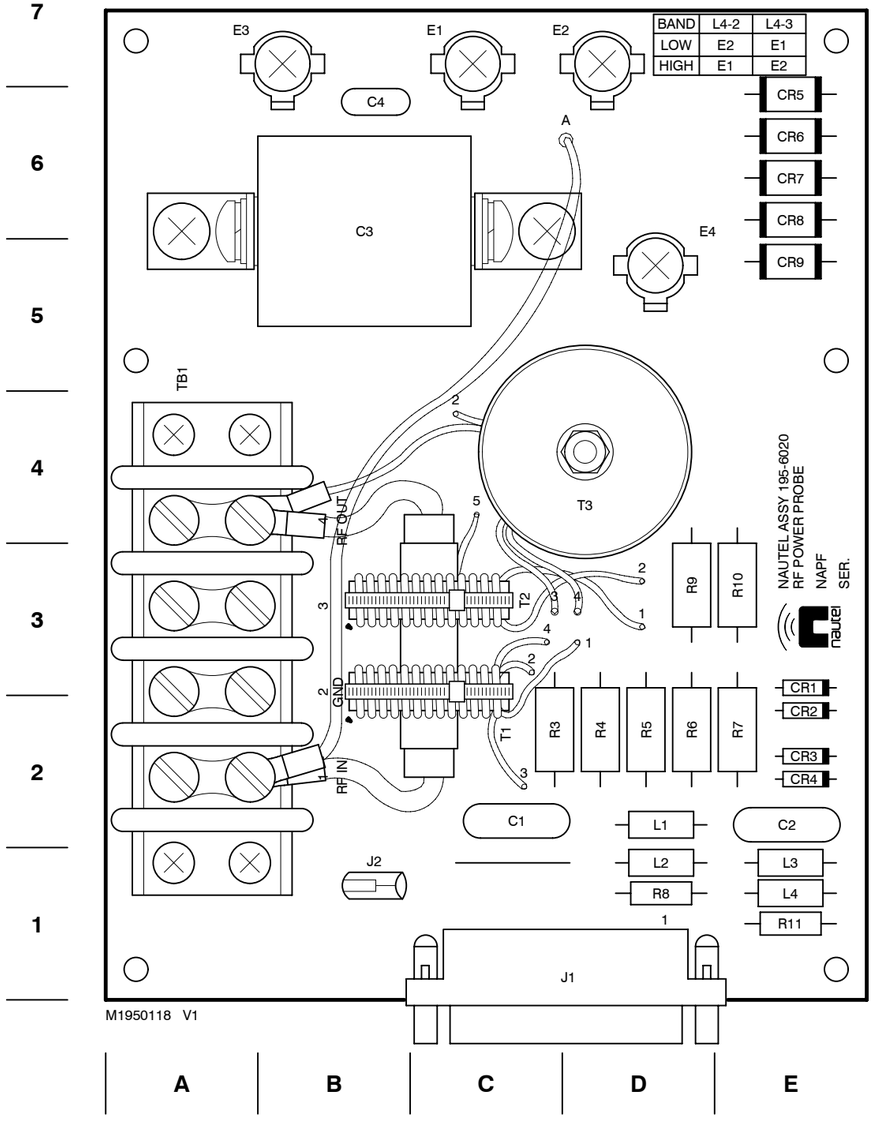
Dimensions = mm (inches)

Assembly Detail - NAAA05/02 Power Amplifier			
Original Issue 3.0	Not to Scale	Figure MD-15	Sheet 1 of 1



Dimensions = mm (inches)

Assembly Detail - NAPF03A/01 RF Filter Input PWB			
Original Issue 3.0	Not to Scale	Figure MD-16	Sheet 1 of 1



Dimensions = mm (inches)

Assembly Detail – NAPF07A/02 Forward/Reflected Power Probe			
Original Issue 3.0	Not to Scale	Figure MD-17	Sheet 1 of 1