KIN-COM®

TECHNICAL REFERENCE MANUAL

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SECTION

1

KIN-COM® Theory of Operation

Device Description

The following section will provide the user with a basic understanding of the KIN-COM system components. By understanding the function of these components, the user should be able to associate their use and relationship to the KIN-COM machine. Please refer to the appropriate KIN-COM Diagrams in this manual.

Loadcell

The Loadcell is used to indicate the direction and amount of force that is applied by the patient. It can accurately measure from one Newton to two thousand Newtons (450 lbs.) of applied force in each direction. The device itself consists of five foil gauges, one for temperature compensation, structured in a bridge configuration and excited by ±5V. It has a full scale output of approximately 1.6 mV/V and an accuracy of .10% F.S.O. which includes non-linearity, hysteresis, and repeatability. Zero temperature error is .003% F.S.O./°F and span temperature range is .003% Reading/°F. The complete compensated temperature range is 50°-150°F and the maximum safe overload is 750 lbs. or 3335 Newtons. Creep, under a continuously applied load is less than ±.05% F.S. after 20 minutes.

Using a 12 bit A/D converter with 4096 units of resolution, we can measure 2048 levels of force in either direction before the converter is overrun. The unit is calibrated with the span in each direction equal to 1 Newton per count which gives us the capacity for 460 lbs. of force measurement. However, since the software needs a guardband prior to converter overrun, it will produce an error condition when the converter reads greater than 4020 counts or 451 lbs. and immediately shut the machine down.

It should be noted that we changed loadcells in 1993 to use a shear beam loadcell instead of the bending beam loadcell. Internal tests showed a 1700% improvement in rejecting undesired signals resulting from an axial offset of the applied load. We also saw a 2500% improvement in rejecting undesired signals resulting from variations in the direction of applied load and a 44% improvement in the correlation coefficient (derived during linear regression analysis of the raw test data) the shear beam loadcell also has superior linearity characteristics.

Tachometer

The Tachometer is directly coupled to the motor shaft and is used to accurately measure the rotational speed of the motor with a linearity of 0.5% (referenced @ 3600 rpm) and it has a bi-directional tolerance of ±1.5%. The output voltage is 3

volts/krpm, consequently at 3000 rpm the tach generates 9 volts for the A/D converter. Maximum arm speed allowed by software is 250 degrees per second which corresponds to 4167 rpm on the motor. Because low motor speeds generate very low signal levels, noise problems can arise in this circuit. Special conditioning amplifiers and pure differential input circuitry is used to help reject common mode noise such as that from a lamp ballast. Since high temperatures can also produce noise, the low temperature coefficient of -0.020%/°C will allow the tachometer to operate in an enclosed area, i.e., the head casting, without degradation.

Patient Abort Switch

The Patient Abort Switch, if depressed or disconnected from the machine, will immediately remove power from the motor. This switch is tied directly into the watchdog timer located inside the computer which controls the "ON" condition of the entire machine. Failure to have the patient switch connected properly to the machine will force an immediate shutdown of all active devices except the computer.

Motor Potentiometer

The motor potentiometer measures the exact position of the motor arm at any time during the exercise. It is made by JDK Controls and is a co-molded device that will not wear out in a control system that "dithers", i.e., uses servo technology to control position (see Figure 1-1). The KIN-COM uses the model 6015 which is a servo mount device with a standard linearity of 0.5% an electrical rotation of 340°, and an output smoothness of 0.1%. The pot is driven with ±5 volts and the resultant voltage level on the wiper, based upon the wiper position, is sent to the computer for conversion. Using a 12 bit A/D converter in the computer, we have 4096 counts across a 10 volt input span which will yield a level of 2.44 millivolts/count. We use 8 counts per degree of rotation or 0.039 volts per degree. At one complete rotation (340°) we use 13.28V/20V or 66% of the total converter range. After conversion this reading is mathematically compared to the position generated by multiplying motor velocity * time to yield a predicted position. If the two numbers do not agree, an error condition occurs and the KIN-COM will shut down.

Seat Positioning Switch

Used on the auto-positioning option, the seat switch will move the patient seat either left or right depending on which direction is selected. This device is a two position rocker switch which is tied, through low voltage, to the PowerBox located on the Attachment Cart. When activated, it will switch 115 Volts AC to the seat motor and move it in the selected direction. All motor movements are disabled during exercise or training for safety purposes. Also, the motor is locked out until the software activates the electronics in preparation for patient evaluation or training.

Head Positioning Switch

The Head Up/Down switch will move the dynamometer up or down depending on which movement is selected. It's operation is similar to the seat positioning actions and involves the same type of circuitry. With the auto-positioning option, a joystick is included to position the actuator not only up and down, but forward and back as well.

PCB 70

PCB 70, located inside the computer, is a circuit board that interfaces the computer to the dynamometer system. It contains all signal conditioning amplifiers, except the autopositioning amplifiers, and some of the digital logic use to determine and set the machine conditions. It also contains the watchdog timer which is used as a safety check on the machine. If, for some reason, the computer should fail, or

the patient abort switch is depressed, the watchdog timer will remove power from the motor and report to the operator that the switch was depressed. Adjustment potentiometers are available externally for the loadcell, tachometer, servo amplifier, and arm potentiometer in the event that recalibration is required.

PCB 71 PCB 71, located inside the computer, contains the circuitry that allows the software to move the seat and head actuators up and down, right and left. This is an optional circuit board that comes with the auto-positioning system.

PCB 72 PCB 72, located inside the computer, contains the circuitry that measures the positions of the linear motors on the head and seat mechanisms. It also contains the four EMG channel connections. This board is optional and comes only with the auto-positioning system.

PowerBox The PowerBox, located beside the computer on the Attachment Cart, contains the DC Servo Amplifier which provides controlled power to the dynamometer. It has provision for real time feedback via the motor tachometer which will ensure that minute corrections to the programmed velocity occur when varying loads are encountered. It also contains the power circuits for moving the head and seat actuators, and the power conditioning circuitry for the computer system.

Mains Unit The "Mains" unit contains the circuit breaker and transformer. In the European version a line filter is also included. The transformer is configurable for 100 volt, 115 volt, and 230 volt AC inputs and is rated at 2000 watts. This device uses UL, CSA, and VDE rated components throughout.

A/D Converter The A/D converter system, located inside the computer consists of two PCB's that convert the analog signals, (pot, tach, loadcell, and positioning pots), into a digital signal that the computer can understand. This system is a twelve bit analog converter device which has a resolution of 4096 points throughout a voltage range of ± 5 volts for the sensors.

Motor The motor is a high performance DC Servo system which uses an ironless rotor delivering very accurate incremental motion.

This design enables the KIN-COM to stop and start at precise angles resulting in a precise range of motion. It also uses a 100 or 80 to 1 gearbox which multiplies the motor torque enabling the system to use a smaller motor for the required torque output.

Component Relationships

The above components operate together to ensure that a safe system will move the patient through a range of motion with either constant force or constant velocity. In the case of constant velocity, or isokinetic exercise, the tachometer will measure the velocity and compare it to the user programmed velocity. If a difference occurs, the machine will stop and display an error message. The tachometer is also compared mathematically to the position read by the potentiometer. Here too, if a discrepancy exists, the machine will shut down.

The computer also reads the signal generated by the loadcell and calculates the difference required to maintain a constant velocity. This difference is then sent to the Servo Amplifier to correct for any lagging speeds that occur due to heavy loads.

All measuring and correcting takes place in ten milliseconds or at a rate of 100 times per second. In the event that an excessive force (greater than 2000 Newtons) is presented to the loadcell, or if a rate of change greater than 600 Newtons/10ms takes place, the dynamometer will shut down and display "Force Error". This error detection ensures that excessive loads or random electrical noise produced by outside influences will not cause a malfunction.

In an Isotonic (constant force) exercise, the computer will read the value of the loadcell signal and adjust the speed of the motor via the servo amplifier. If the patient exerts a greater load than the programmed load, the motor will speed up, thus reducing the load. If the patient exerts less load than programmed, the computer will slow the motor down and stop if necessary.

In a passive exercise, the computer tells the servo amplifier to maintain a constant velocity, and at the same time, monitors the load cell for a force that is greater than the preset maximum load. If this load is exceeded, the movement will stop.

Control Method

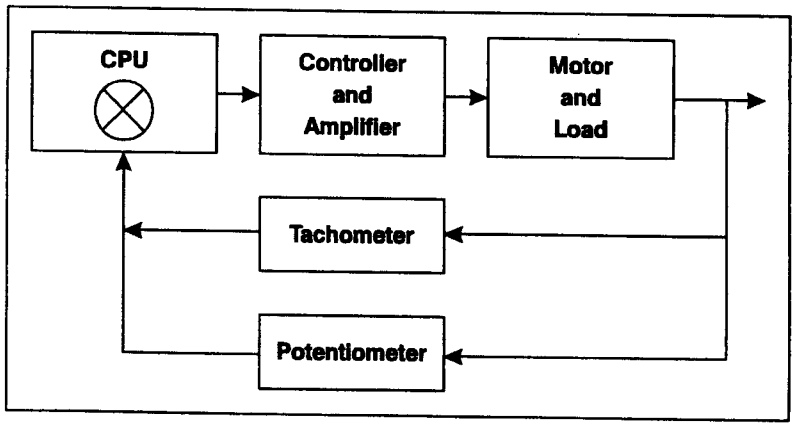
Closed Loop Control

A change in load, voltage, motor speed, or operating environment can cause a change in their operating characteristics. A closed-loop control system requires continuous correction for optimum performance. The loop is closed by a sensor or transducer capable of measuring some physical variable and translating that measurement into a signal that can be mixed with the system input signal, which is a reference signal or setpoint. The objective of the system is to make its output equal to its input.

In this application, the feedback sensors, consisting of a pot and a tachometer, generate signals proportional to the position and speed of the actuator arm. The tachometer generates a signal proportional to the speed of the actuator and is fed to the computer. The computer compares this signal to the required speed and makes the speed adjustments to the servo amplifier command line. If the motor is turning faster than the required speed, the computer will slow the motor by lowering the command line voltage to the servo amplifier. The difference between the tachometer output and the required speed is called the "error" signal. This error signal is calculated by the computer, which acts like the "summing juction" (Figure 1-1) and the correction is made to the "command line" going to the servo amplifier which will increase or decrease the motor speed. If the motor speed is adjusted correctly, the error signal will be zero and the command line voltage will remain the same.

Closed Loop Control System

FIGURE 1-1



SECTION

2

KIN-COM® Calibration Procedures

Standard and Enhanced Models

The KIN-COM Service Program is divided into two major sections listed on the Main Service Menu as Diagnostics and Calibration.

The Diagnostic portion of the program will check out the major functions of the unit, report any faults, and give suggestions on where the possible problems could occur. Following these suggestions in the order that they are listed will assist in the trouble shooting process. The program will ask the operator if he would like to make any adjustments if they are necessary. The program was designed to be user friendly; please follow the prompts carefully.

The Calibration portion of the program should be used only by a qualified technician to do a detailed calibration of the unit.

NOTE: All adjustments are made at the back of the computer located on the attachment cart.

Procedure

- POWER UP THE KIN-COM SYSTEM. From the KIN-COM Main Menu select "U" or "Utilities", type the word "TEST", read the resulting message, then type the word "YES". The KIN-COM Service Menu should be displayed on the monitor. It will display two options: 1.) Diagnostic Check and 2.) Calibration. Choose "2", Calibration.
- PRELIMINARY PCB-70 POTENTIOMETER SETTINGS

  NOTE: The next step need not be performed if the PCB-70 has been previously calibrated.
- Position all pots (8 in all) to their center position. These are 15 turn potentiometers, therefor the center position would be 7.5 turns from one extreme.
- PROCEED WITH CALIBRATION BY PRESSING "1" for Angle calibration.

Angle Calibration

NOTE: If the KIN-COM has been previously calibrated and the Angle Potentiometer drive belt has not been loosened or moved, skip the mechanical adjusting procedure and proceed to the electrical adjustments.

Mechanical Adjustment

- Move the arm to mechanical zero by aligning it with the "1" mark on the indicator decal. Remove the three bolts that retain the pulley cover and remove the sheetmetal cover.
- Loosen the Idler Positioning Assembly on the Head by loosening the two securing screws. Position the assembly to relieve tension on the Drive Belt.
- Manually rotate the Angle potentiometer (the large pulley) while monitoring the Angle Value displayed on the CRT screen. Adjust for an indication of "0" degrees ± 5°.
- Replace the sheetmetal cover on the Head Assembly.

Electronic Zero Adjustment

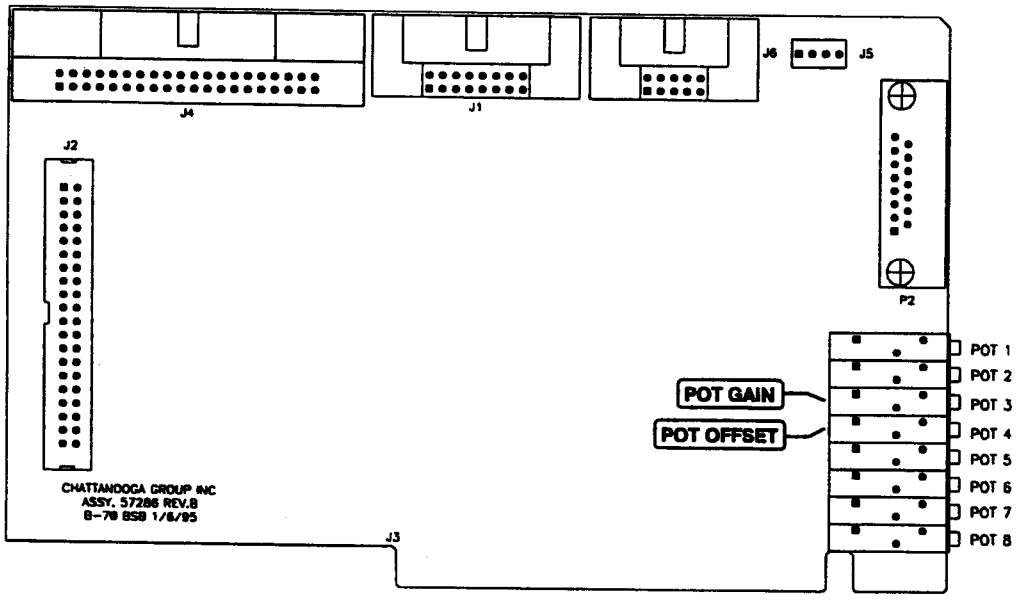
- Remove the loadcell from the arm and insure that the arm is located in a true horizontal position facing toward the front of the machine. The head may have to be rotated to position the arm on its' side.
- Using a spirit level, position the Motor Arm to a true horizontal position.
- Referring to Figure 1, adjust "Pot 4" (pot offset) for a displayed Angle Value of 0.0 degrees.

Electronic Span Adjustment

- Again utilizing a spirit level, rotate the Motor Arm CW until a true vertical position is obtained.
- Referring to Figure 1, adjust "Pot 3" (pot gain) for a displayed Angle Value of 90.0 degrees.
- Rotate the arm CCW until a true vertical position is obtained.
- The displayed Angle Value should be -90.0 degrees. If incorrect, readjust "Pot 3" to reduce the error by half and perform the next step.
- Rotate the Motor Arm CW for a true horizontal position. Adjust "Pot 4" for a display Angle Value of 0.0 degrees then repeat this complete Angle Span Adjustment procedure.
- Press (ESC) to return to the KIN-COM Calibration Menu.

B70 Circuit Board

FIGURE 2-1 – All pots are accessible from rear of Computer.



Force Calibration

To select force calibration, press "3" from the main service menu.

Force Offset Adjustment

- Install the Load Cell Assembly on the Actuator Arm and rotate the Arm to a true vertical position.
- While monitoring the Force value on the CRT screen, adjust "Pot 8" (Fig. 2-2), located at the computer backpanel, for a displayed value of 0 ± 1 Newton. Make sure there is NO FORCE on the loadcell during this adjustment.

Force Gain Adjustment

- Rotate the Actuator Arm to a true Horizontal position pointing away from the unit. Rotate the mechanical stop to a position under the actuator arm that will support the arm when a weight is placed on the loadcell.

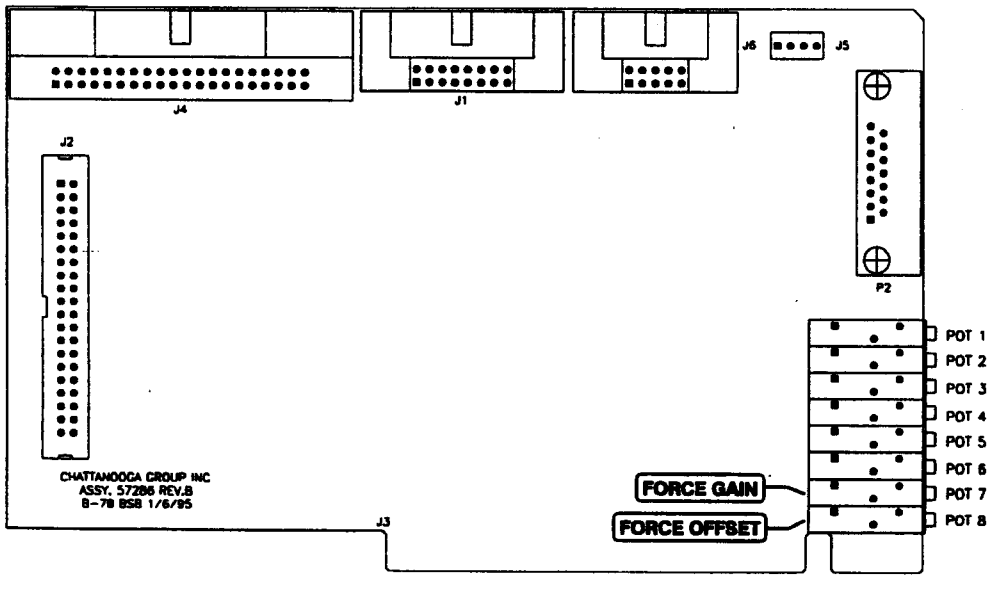
  NOTE: Chattanooga Group recommends using a 50 pound KNOWN WEIGHT for the following test but any KNOWN WEIGHT over 20 pounds can be used. Force is displayed in Newtons; 4.45 Newtons is equal to 1 pound (9.8 Newtons = 1Kg).

  Example A: If a 50 LB weight is used, the displayed Force should read 222 ± 2 Newtons.

  Example B: If a 20 Kg weight is used, the displayed Force value should read 196 ± 2 Newtons.
- Hang the KNOWN WEIGHT on the Loadcell. It is important that the weight be hanging free and is stable (not moving or swinging).
- Adjust potentiometer "Pot 7" (Fig. 2-2) for a displayed force value equal to the weight you have on the Loadcell. An error of 2% is acceptable.
- Remove the weight from the Loadcell Assembly.
- Remove the Loadcell Assembly from the Motor Shaft.
- Press (ESC) to return to the KIN-COM Calibration Menu.

B70 Circuit Board

FIGURE 2-2 – All pots are accessible from rear of Computer



Servo and Velocity Calibration

To select velocity and servo adjustment, press "2" from the main service menu.

Preliminary Speed Zero Check / Adjustment

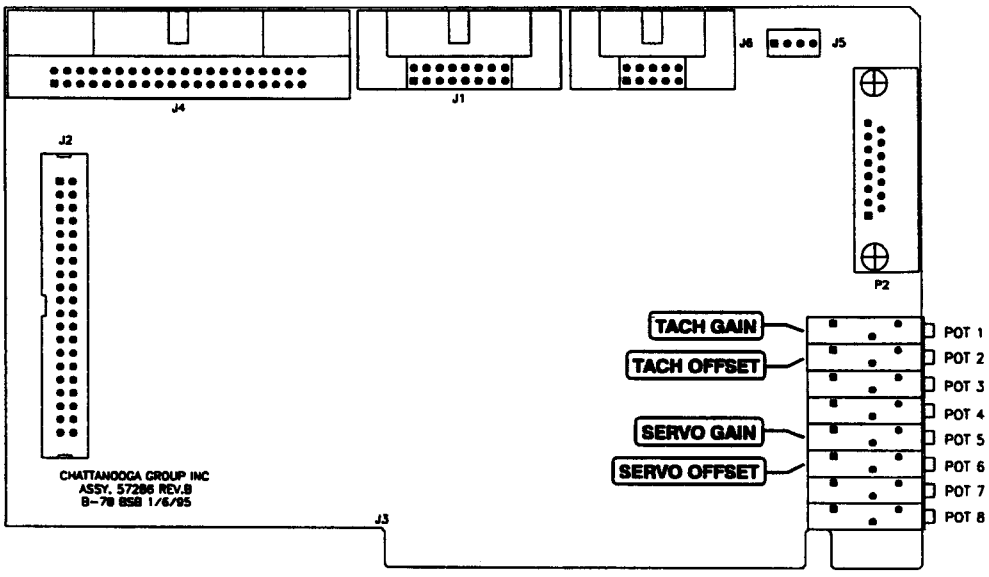
- Turn both Motor (F1) an Servo (F2) to "ON" and observe the actuator arm. If movement is observed, adjust potentiometer "Pot 6" (Fig. 2-3) until the actuator does not move.
- Displayed Tacho Velocity: Should be indicating a velocity of 0, ±1. If incorrect, adjust potentiometer "Pot 2" (Fig. 2-3) for a correct indication.

Servo Balance and Velocity Balance Adjustment

- **CAUTION:** THIS PROCEDURE WILL UTILIZE HIGH SPEED SHAFT ROTATION. INSURE THAT THE LOADCELL ASSEMBLY IS NOT ON THE MOTOR SHAFT AND THAT BOTH OF THE MECHANICAL STOPS ARE LOCATED CLOSE TOGETHER.
- Turn both Motor (F1) and Servo (F2) to "ON", then press (F3), and enter a speed of 60. The Motor Shaft will start rotating in order to automatically find the maximum range of motion. This ROM will depend on where the mechanical stops are placed. For maximum ROM, locate the two stops close together.
- Adjust potentiometer "Pot 6" (Fig. 2-3) for equal + and - numbers as displayed in the Servo Velocity box.
- Adjust potentiometer "Pot 5" (Fig. 2-3) for a displayed Servo Velocity indication of 60 degrees per second. Some interaction may occur between offset and gain while setting these pots. Alternate between the two until a stable reading of ± 60 degrees per second ±1° /sec is achieved.
- Adjust potentiometer "Pot 1" (Fig. 2-3) for a displayed Tacho Velocity indication of ± 60 degrees per second. Polarity (+/-) of these readings should agree with the displayed Servo Velocity indications. Also, the numbers should agree within 1 degree per second.
- Repeat the previous two steps until no further improvements are possible. When properly adjusted, the Servo and Tachometer readings should agree within ±1 degree.
- Press (F1) then (F2). The system should stop. Press (F3) and enter a speed of 250.
- Press (F1) then (F2). After the CPU has the required range of motion, the actuator will move at high speed. Verify that the Servo Velocity and Tacho Velocity read 250 ±4 degrees/sec. If incorrect, repeat procedure.
- Press (ESC) to return to the KIN-COM Calibration Menu.
- Press (ESC) to return to the Service Menu.

B70 Circuit Board

FIGURE 2-3 – All pots are accessible from rear of Computer.



Autopositioning Calibration

To select autopositioning calibration, press "5" from the main service menu.

Seat Adjustment

- Move Seat to the "Zero position on the linear marker. Adjust potentiometer "Pot 2" (Fig. 2-4) until a reading of 0 is obtained on the display.
- Move the Seat to 90 CM as indicated on the linear marker. Adjust potentiometer "Pot 1" (Fig. 2-4) until a reading of 90 is obtained. Due to the interaction of these two potentiometers, readjustment may be required for the zero setting.

Head Adjustment

- Move actuator Head to the "Zero" (back) position on the linear marker. adjust potentiometer "Pot 6" (Fig. 2-4) until a reading of 0 is obtained on the display.
- Move the Head to 75 CM as indicated on the linear marker. Adjust potentiometer "Pot 5" (Fig. 2-4) until a reading of 75 is obtained. Due to the interactions of these two potentiometers, readjustments may be required for the zero setting.
- Move the Head to the lowest (down) position. Adjust potentiometer "Pot 4" (Fig. 2-4) until a reading of -.5 is obtained on the display.
- Move the Head to the highest position possible (up). Adjust potentiometer "Pot 3" (Fig. 2-4) until a reading of 61.5 is obtained. Due to the interactions of these two potentiometers, readjustments may be required for the -.5 setting.

Final Check

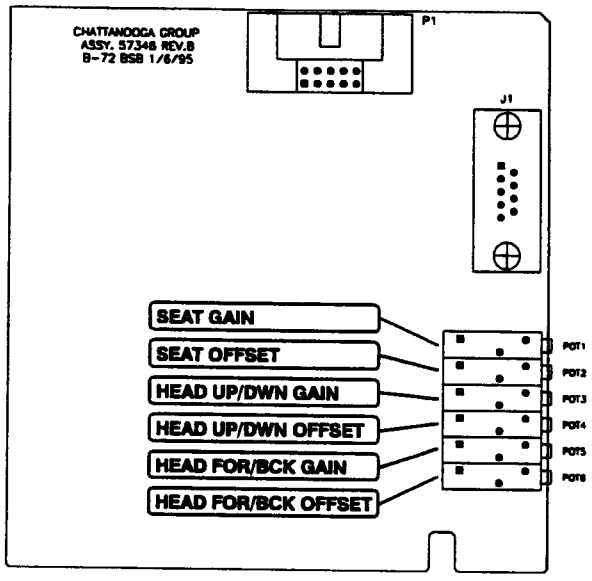
- From the KIN-COM Service Menu press(1) to enter the Diagnostic Check Program and follow all prompts.
- The Diagnostic check should be completed without any error. If an error occurs, follow the Trouble Shooting suggestions provided on the Error Screen.

Calibration Complete

For further information or help, call the Chattanooga Group Service department: 1-800-322-7343.

B72 Circuit Board

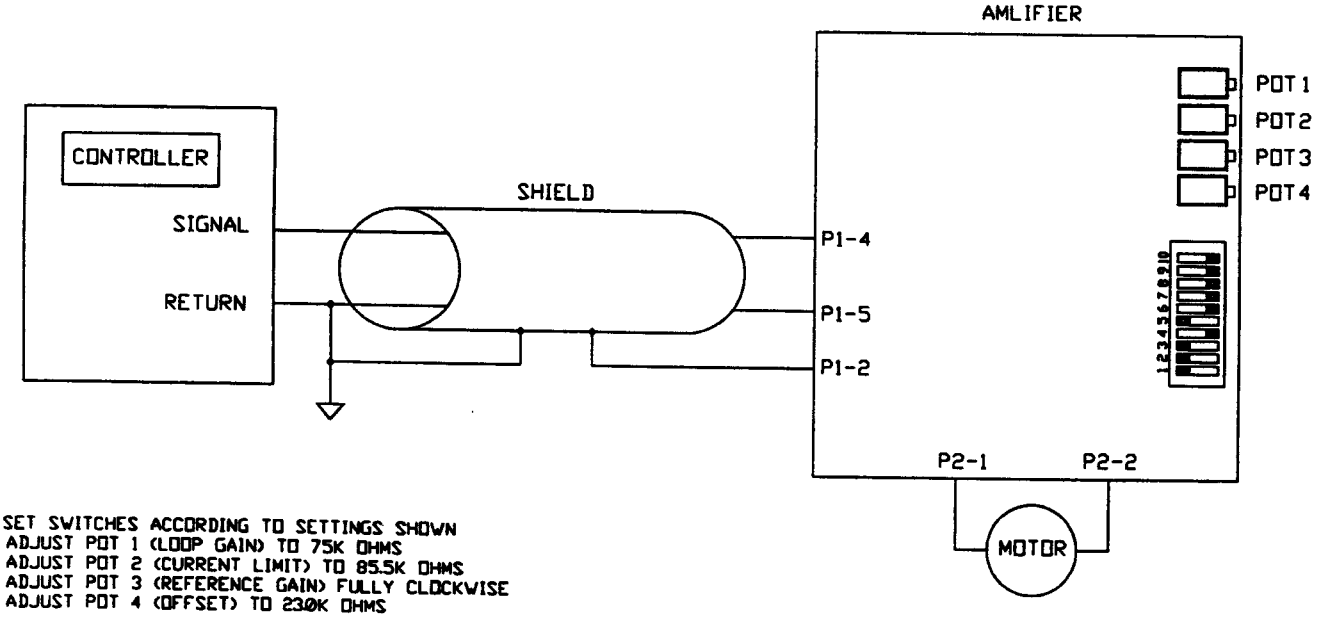
FIGURE 2-4 – All pots are accessible from rear of Computer.



Amplifier Adjustment

NOTE: The servo amplifier should be received already calibrated. If it has not been calibrated, or needs to be recalibrated, refer to the drawing on the next page.

FIGURE 2-5 – Amplifier Calibration (Reference for 30A20AC)



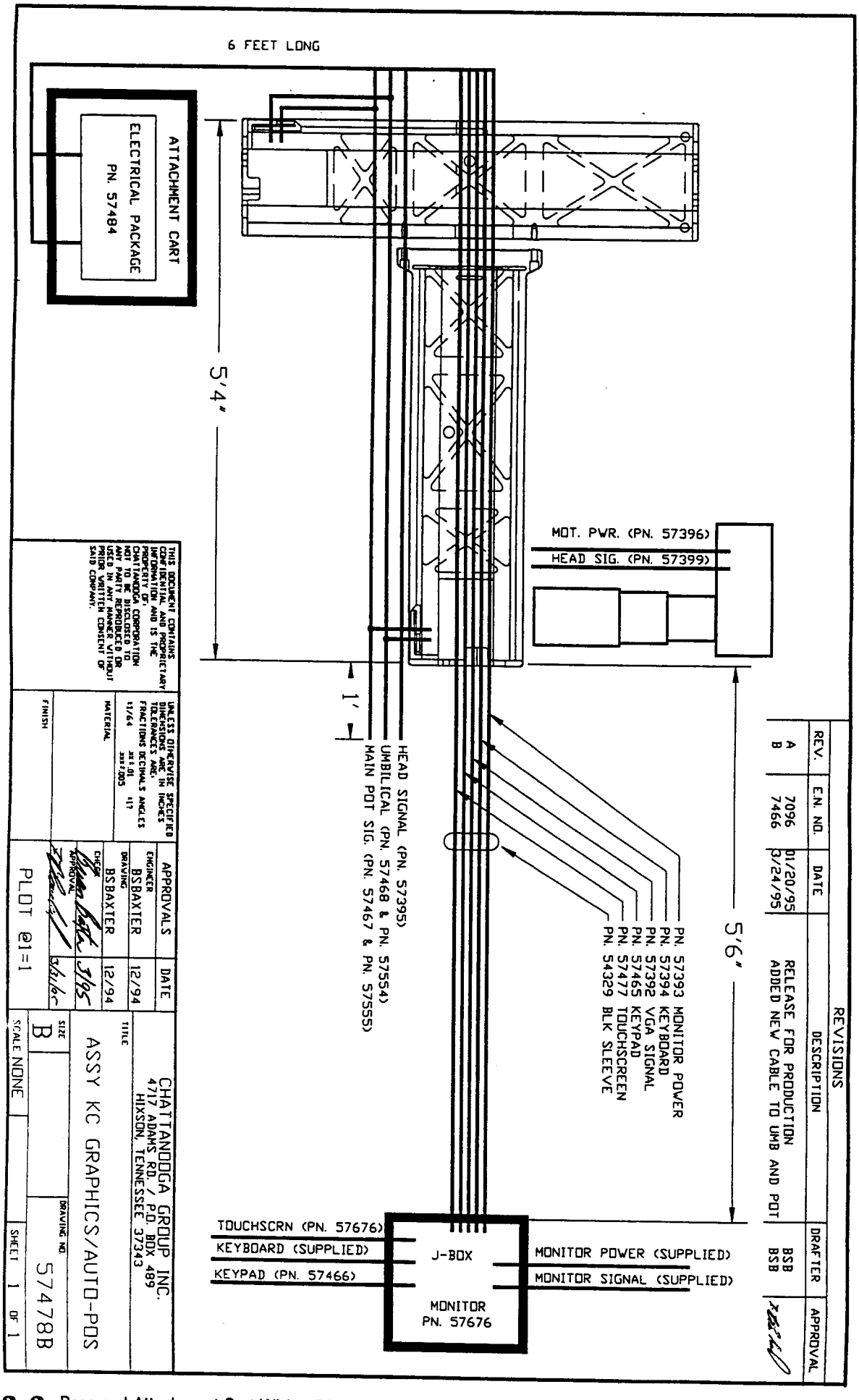
1.) SET SWITCHES ACCORDING TO SETTINGS SHOWN
2.) ADJUST POT 1 (LOOP GAIN) TO 75K OHMS
3.) ADJUST POT 2 (CURRENT LIMIT) TO 85.5K OHMS
4.) ADJUST POT 3 (REFERENCE GAIN) FULLY CLOCKWISE
5.) ADJUST POT 4 (OFFSET) TO 230K OHMS

MEASURE POTS 1 AND 2 FROM THEIR TESTPOINTS (LOCATED IN FRONT OF THE ADJ. SCREW) AND FROM PIN 16 OF THE 16 PIN CONNECTOR
MEASURE POTS 3 AND 4 FROM THEIR TESTPOINTS (LOCATED IN FRONT OF THE ADJ. SCREW) FROM PIN 2 OF THE 16 PIN CONNECTOR

SECTION

3

Base and Attachment Cart Wiring Diagrams


6 FEET LONG
ATTACHMENT CART
ELECTRICAL PACKAGE
PN. 57484
5'4"
MOT. PWR. (PN. 57396)
HEAD SIG. (PN. 57399)
1'
HEAD SIGNAL (PN. 57395)
UMBILICAL (PN. 57468 & PN. 57554)
MAIN POT SIG. (PN. 57467 & PN. 57555)
PN. 57393 MONITOR POWER
PN. 57394 KEYBOARD
PN. 57392 VGA SIGNAL
PN. 57465 KEYPAD
PN. 57477 TOUCHSCREEN
PN. 54329 BLK SLEEVE
5'6"
TOUCHSCRN (PN. 57676)
KEYBOARD (SUPPLIED)
KEYPAD (PN. 57466)
J-BOX
MONITOR
PN. 57676
MONITOR POWER (SUPPLIED)
MONITOR SIGNAL (SUPPLIED)
REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | RELEASE FOR PRODUCTION | BSB
B | 7466 | 3/24/95 | ADDED NEW CABLE TO UMB AND POT | BSB
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FINISH
APPROVALS | DATE
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DRAWING BSBAXTER | 12/94
CHECK APPROVAL | 3/31/95
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CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
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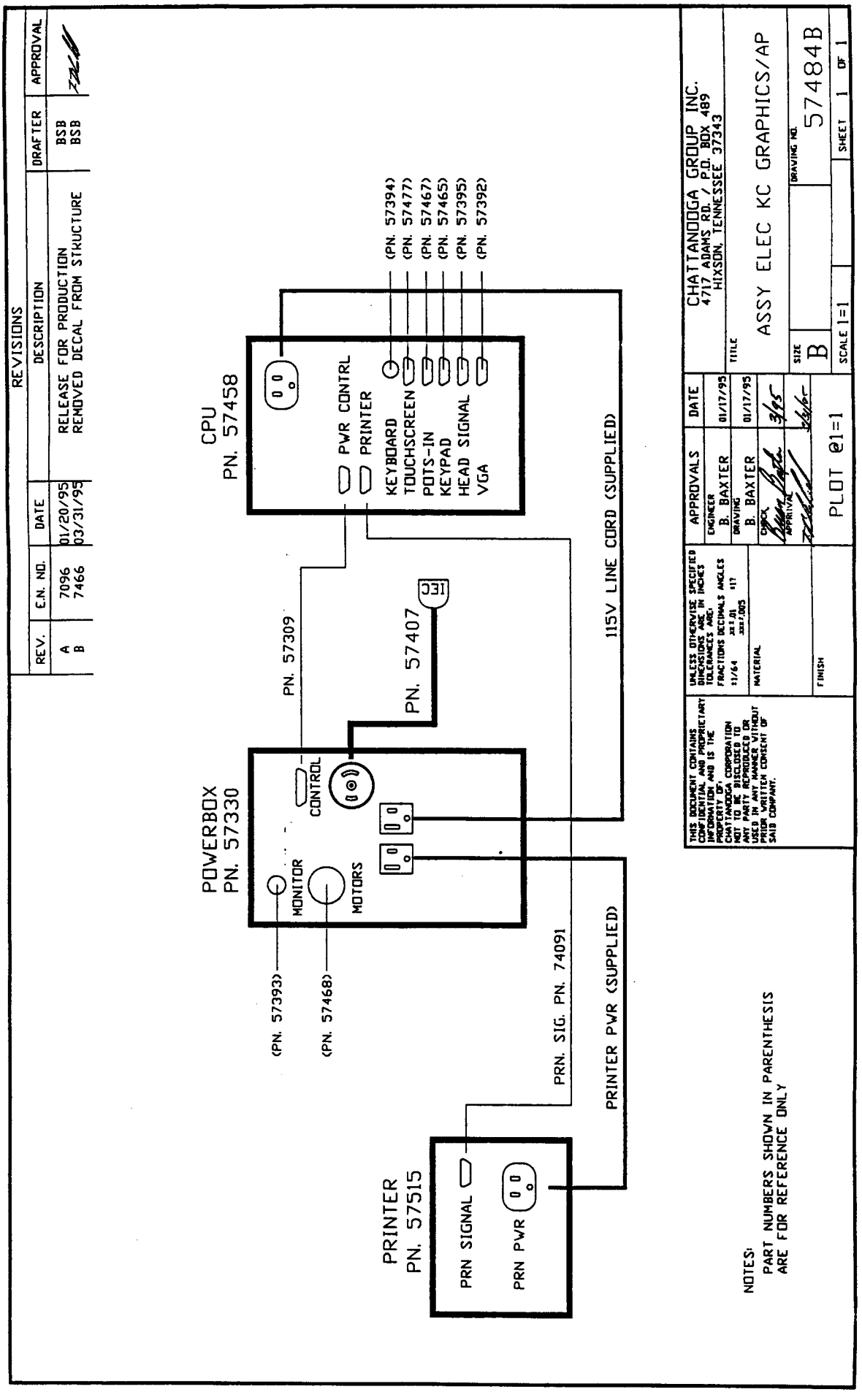
REVISIONS
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A 7096 01/20/95 RELEASE FOR PRODUCTION BSB
B 7466 03/31/95 REMOVED DECAL FROM STRUCTURE BSB
CPU
PN. 57458
PWR CONTRL
PRINTER
KEYBOARD
TOUCHSCREEN
POTS-IN
KEYPAD
HEAD SIGNAL
VGA
(PN. 57394)
(PN. 57477)
(PN. 57467)
(PN. 57465)
(PN. 57395)
(PN. 57392)
PN. 57309
PN. 57407
115V LINE CORD (SUPPLIED)
POWERBOX
PN. 57330
CONTROL
MONITOR
MOTORS
(PN. 57393)
(PN. 57468)
PRN. SIG. PN. 74091
PRINTER PWR (SUPPLIED)
PRINTER
PN. 57515
PRN SIGNAL
PRN PWR
NOTES:
PART NUMBERS SHOWN IN PARENTHESIS
ARE FOR REFERENCE ONLY
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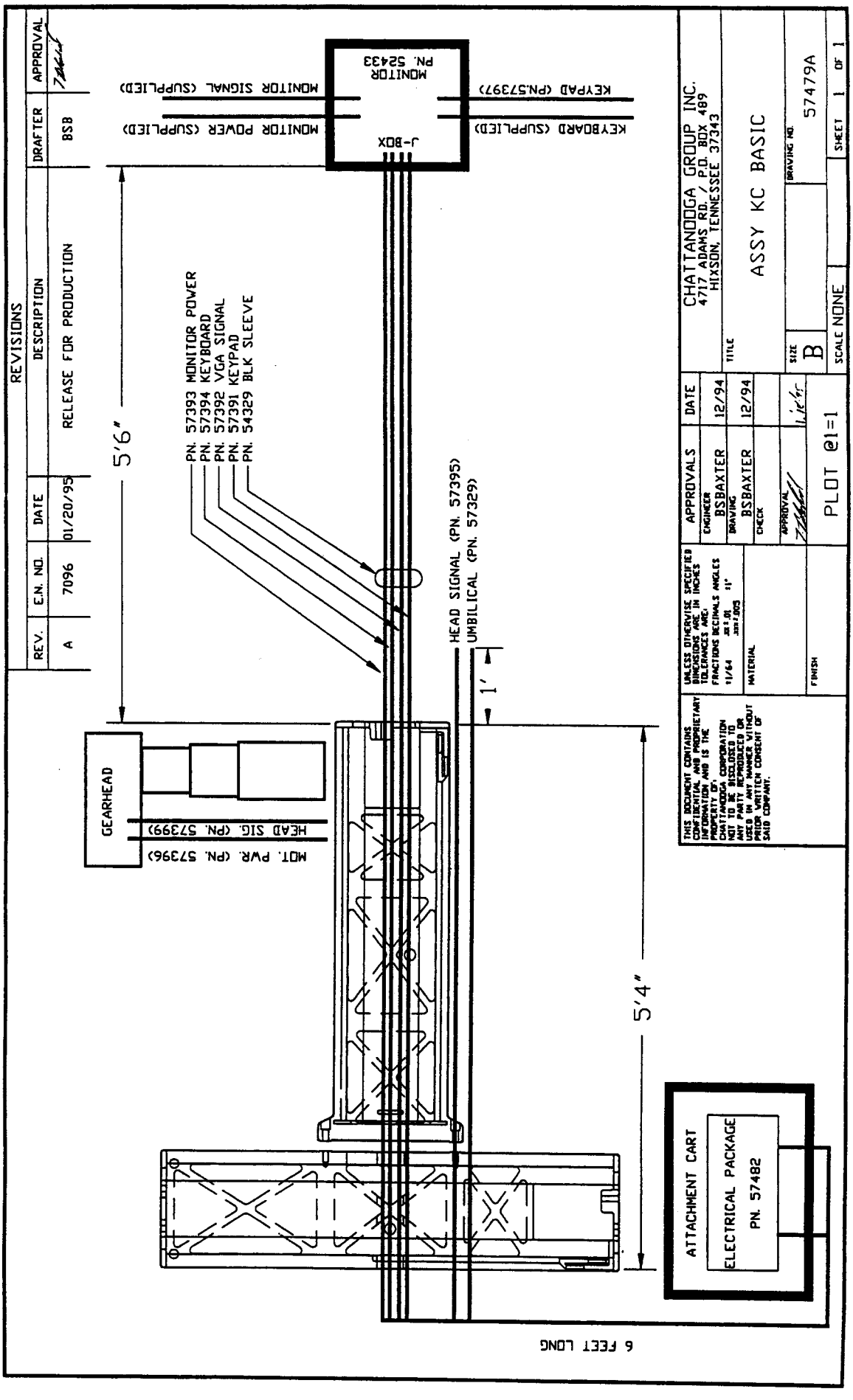
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES
MATERIAL
FINISH
APPROVALS DATE
ENGINEER B. BAXTER 01/17/95
DRAWING B. BAXTER 01/17/95
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
ASSY ELEC KC GRAPHICS/AP
SIZE B
DRAWING NO. 57484 B
SCALE 1=1
SHEET 1 OF 1

Graphics/AP Electrical Assembly Parts – 57484

QNTY	PART No.	DESCRIPTION	NOTES
1	57515	Printer Epson Color Stylus	
1	74091	Cable Printer Signal	
1	57330	Powerbox KCMP	
1	57407	Harness Powerbox/Mains	
1	57309	Harness Powerbox Control	
1	57458	CPU Compaq S-100	


REVISIONS
REV. E.N. NO. DATE DESCRIPTION DRAFTER APPROVAL
A 7096 01/20/95 RELEASE FOR PRODUCTION BSB
MONITOR PN. 52433
J-BOX
MONITOR SIGNAL (SUPPLIED)
MONITOR POWER (SUPPLIED)
KEYPAD (PN.57397)
KEYBOARD (SUPPLIED)
5'6"
PN. 57393 MONITOR POWER
PN. 57394 KEYBOARD
PN. 57392 VGA SIGNAL
PN. 57391 KEYPAD
PN. 54329 BLK SLEEVE
HEAD SIGNAL (PN. 57395)
UMBILICAL (PN. 57329)
1'
GEARHEAD
HEAD SIG. (PN. 57399)
MOT. PWR. (PN. 57396)
5'4"
ATTACHMENT CART
ELECTRICAL PACKAGE
PN. 57482
6 FEET LONG
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
ASSY KC BASIC
APPROVALS DATE
ENGINEER BSBAXTER 12/94
DRAWING BSBAXTER 12/94
CHECK
APPROVAL
PLOT @1=1
SIZE B
DRAWING NO. 57479A
SCALE NONE
SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES 11/64 .XX ±1.01 .XXX ±.005 1°
MATERIAL
FINISH
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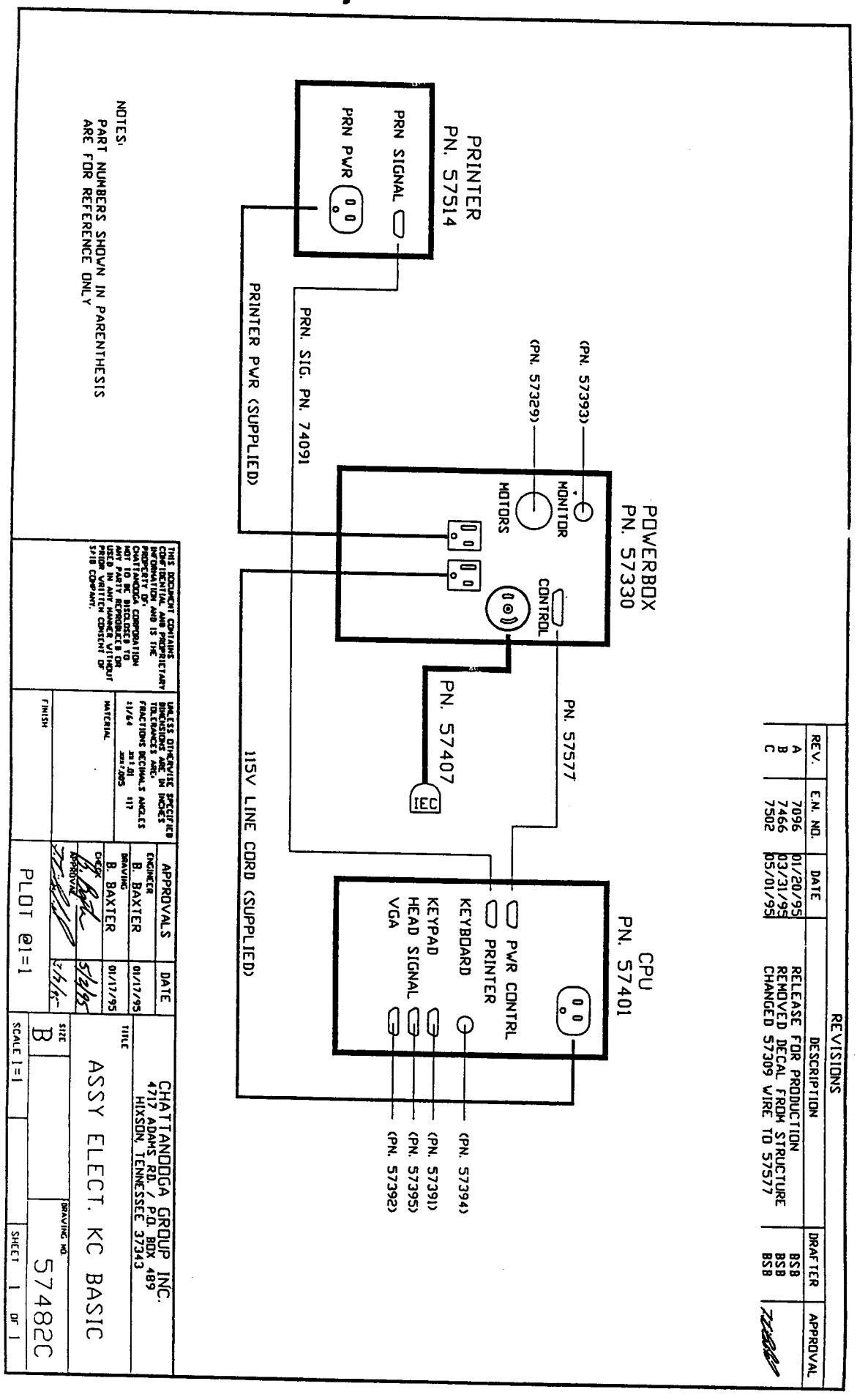
Basic Electrical Assembly – 57482



NOTES:
PART NUMBERS SHOWN IN PARENTHESIS ARE FOR REFERENCE ONLY

REVISIONS

REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01/20/95	RELEASE FOR PRODUCTION	BSB	
B	7466	03/31/95	REMOVED DECAL FROM STRUCTURE	BSB	
C	7502	05/01/95	CHANGED 57309 WIRE TO 57577	BSB	

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 ±.01 ±1°
MATERIAL

FINISH

APPROVALS		DATE
ENGINEER	B. BAXTER	01/17/95
DRAWING	B. BAXTER	01/17/95
CHECK		
APPROVAL		

PLOT @1=1

CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343

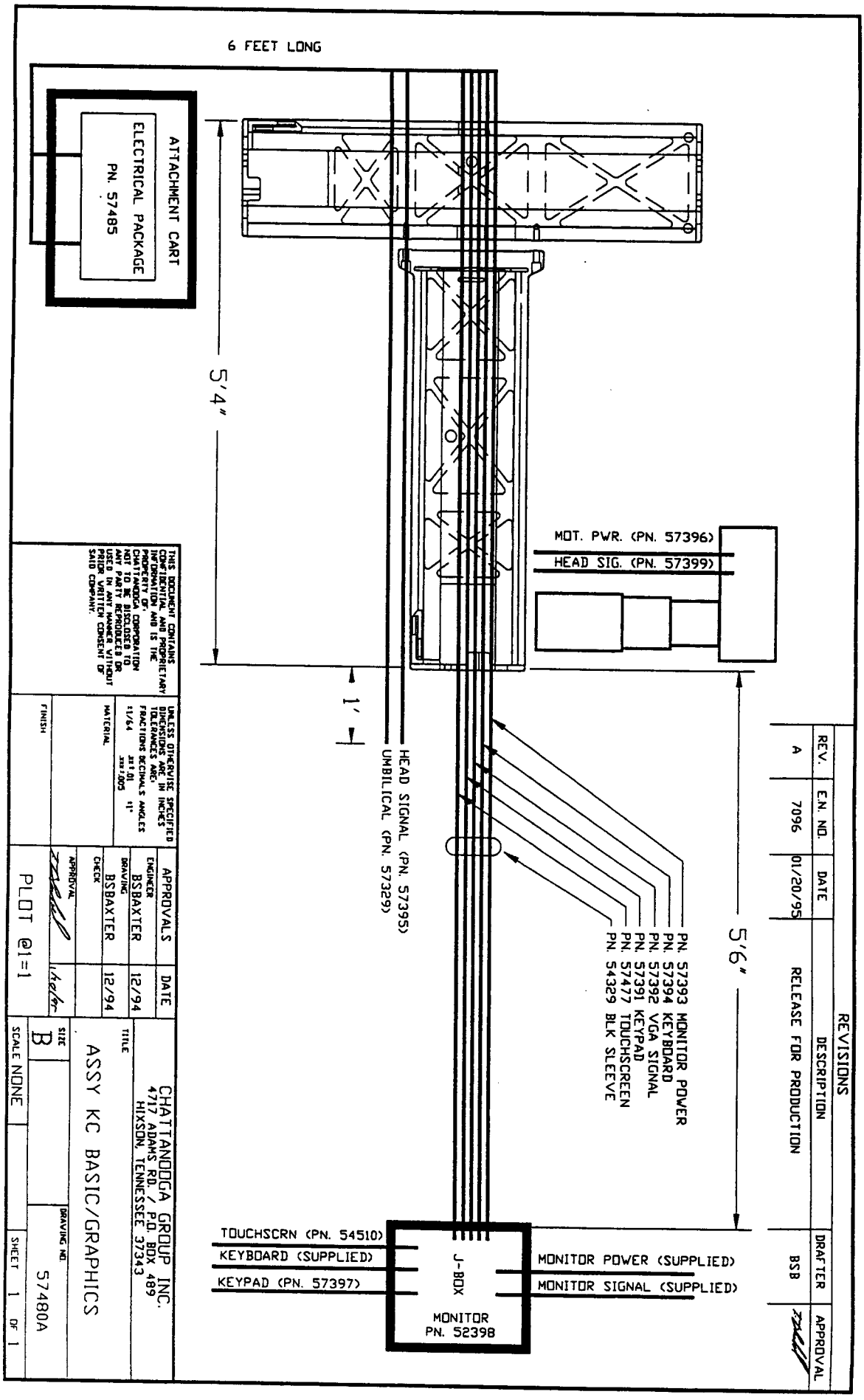
TITLE
ASSY ELECT. KC BASIC

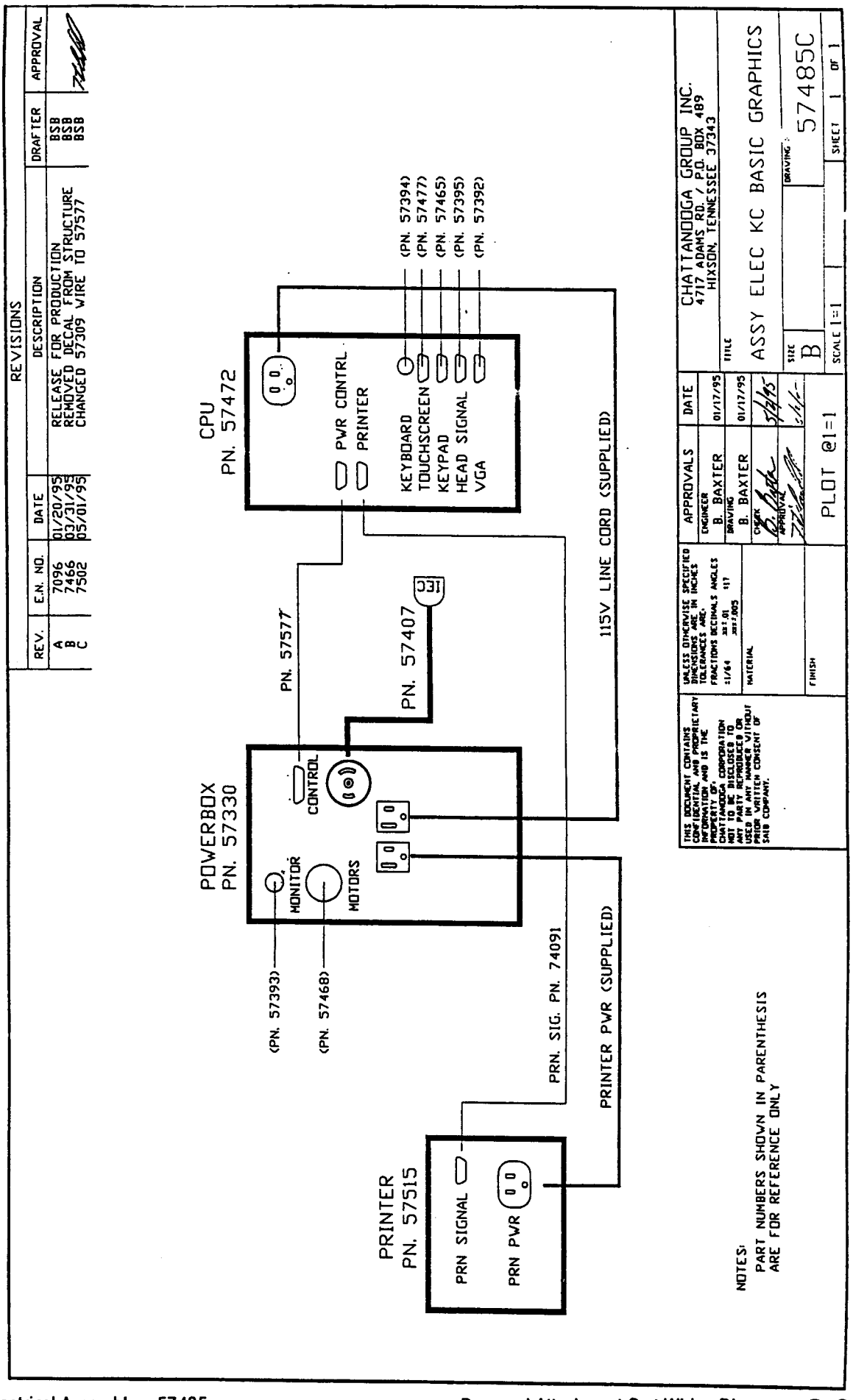
SIZE	DRAWING NO.	
B	57482C	
SCALE 1=1	SHEET 1	OF 1

Basic Electrical Assembly Parts – 57482

QNTY	PART No.	DESCRIPTION	NOTES
1	57514	Printer Epson 800 Plus	
1	74091	Cable Printer Signal	
1	57330	Powerbox KCMP	
1	57407	Harness Powerbox/Mains	
1	57577	Harness Powerbox Control	
1	57401	CPU Compaq R-100	

Basic Graphics Assembly – 57480




REVISIONS
REV. E.N. NO. DATE DESCRIPTION DRAFTER APPROVAL
A 7096 01/20/95 RELEASE FOR PRODUCTION BSB
B 7466 03/31/95 REMOVED DECAL FROM STRUCTURE BSB
C 7502 05/01/95 CHANGED 57309 WIRE TO 57577 BSB
CPU
PN. 57472
PWR CONTRL
PRINTER
KEYBOARD (PN. 57394)
TOUCHSCREEN (PN. 57477)
KEYPAD (PN. 57465)
HEAD SIGNAL (PN. 57395)
VGA (PN. 57392)
PN. 57577
PN. 57407
115V LINE CORD (SUPPLIED)
POWERBOX
PN. 57330
CONTROL
MONITOR
MOTORS
(PN. 57393)
(PN. 57468)
PRN. SIG. PN. 74091
PRINTER PWR (SUPPLIED)
PRINTER
PN. 57515
PRN SIGNAL
PRN PWR
NOTES:
PART NUMBERS SHOWN IN PARENTHESIS
ARE FOR REFERENCE ONLY
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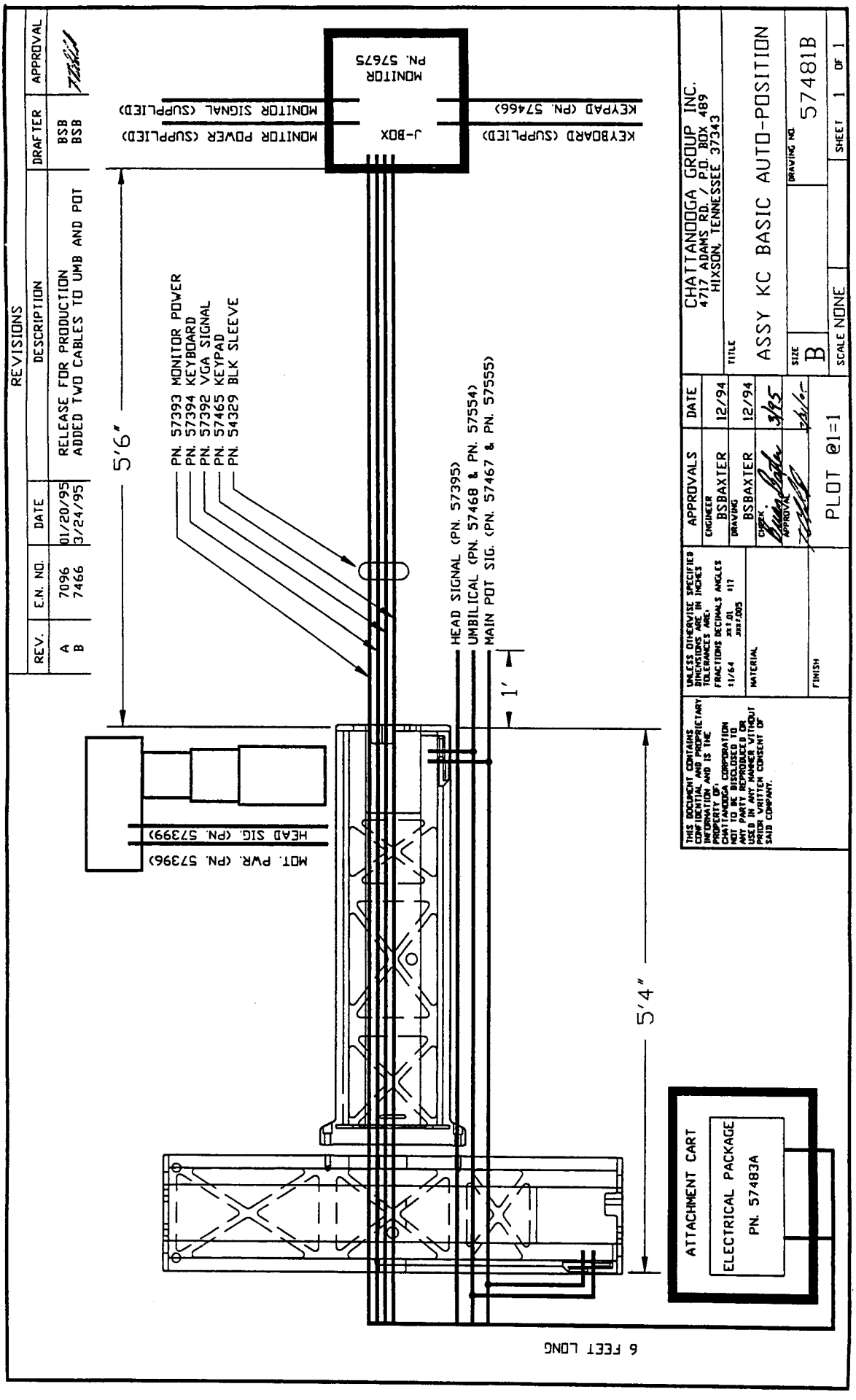
MATERIAL
FINISH
APPROVALS DATE
ENGINEER B. BAXTER 01/17/95
DRAWING B. BAXTER 01/17/95
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
ASSY ELEC KC BASIC GRAPHICS
SIZE B
DRAWING 57485C
SCALE 1=1
SHEET 1 OF 1

Basic Graphics Electrical Assembly Parts – 57485

QNTY	PART No.	DESCRIPTION	NOTES
1	57515	Printer Epson Color Stylus	
1	74091	Cable Printer Signal	
1	57330	Powerbox KCMP	
1	57407	Harness Powerbox/Mains	
1	57577	Harness Powerbox Control	
1	57472	CPU Compaq T-100	


REVISIONS
REV. E.N. NO. DATE DESCRIPTION DRAFTER APPROVAL
A 7096 01/20/95 RELEASE FOR PRODUCTION BSB
B 7466 3/24/95 ADDED TWO CABLES TO UMB AND POT BSB
MONITOR PN. 57675
J-BOX
KEYBOARD (SUPPLIED)
KEYPAD (PN. 57466)
MONITOR POWER (SUPPLIED)
MONITOR SIGNAL (SUPPLIED)
5'6"
PN. 57393 MONITOR POWER
PN. 57394 KEYBOARD
PN. 57392 VGA SIGNAL
PN. 57465 KEYPAD
PN. 54329 BLK SLEEVE
HEAD SIGNAL (PN. 57395)
UMBILICAL (PN. 57468 & PN. 57554)
MAIN POT SIG. (PN. 57467 & PN. 57555)
1'
5'4"
MOT. PWR. (PN. 57396)
HEAD SIG. (PN. 57399)
ATTACHMENT CART
ELECTRICAL PACKAGE
PN. 57483A
6 FEET LONG
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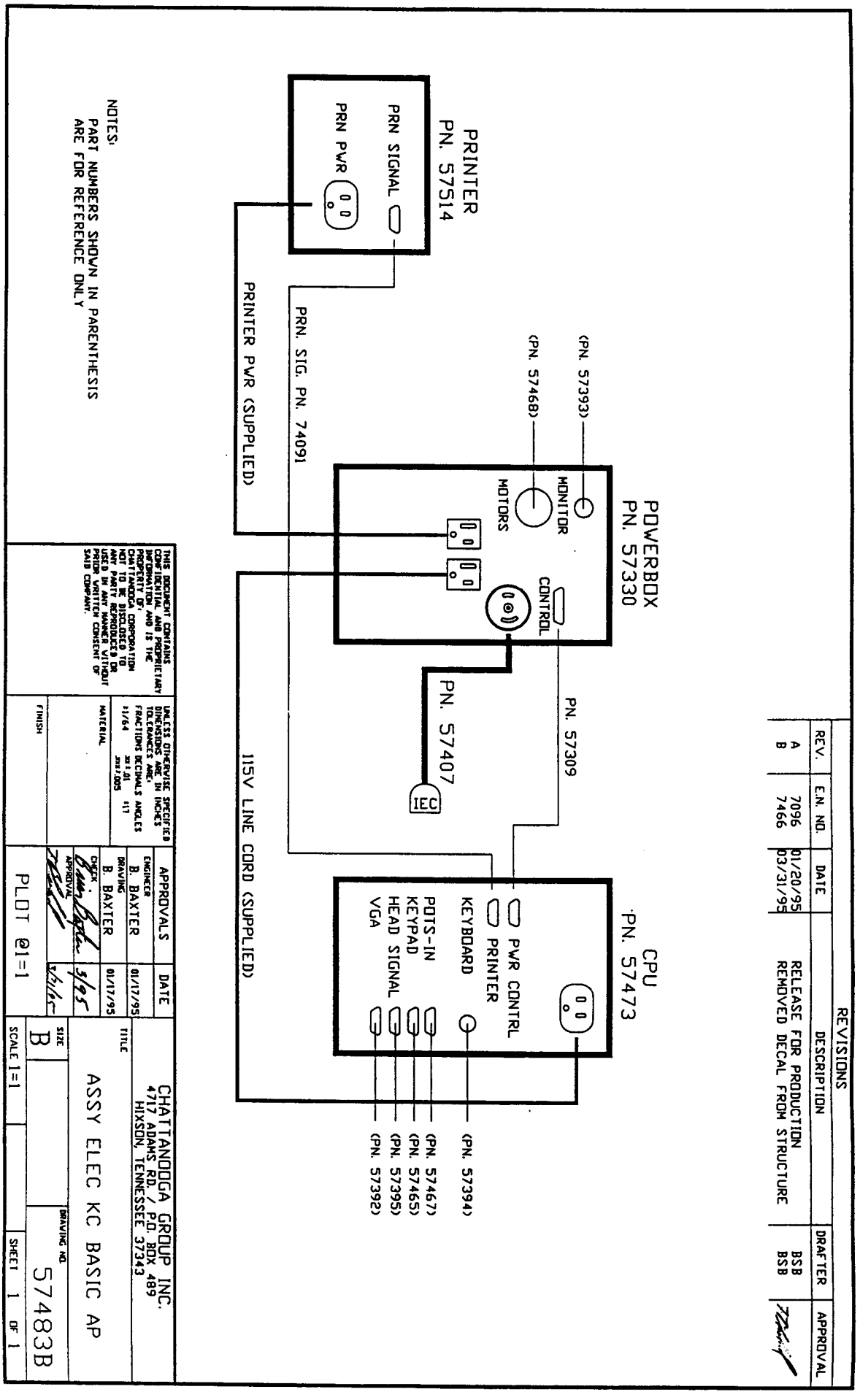
MATERIAL
FINISH
APPROVALS DATE
ENGINEER BSBAXTER 12/94
DRAWING BSBAXTER 12/94
CHECK. APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
ASSY KC BASIC AUTO-POSITION
SIZE B
DRAWING NO. 57481B
SCALE NONE
SHEET 1 OF 1

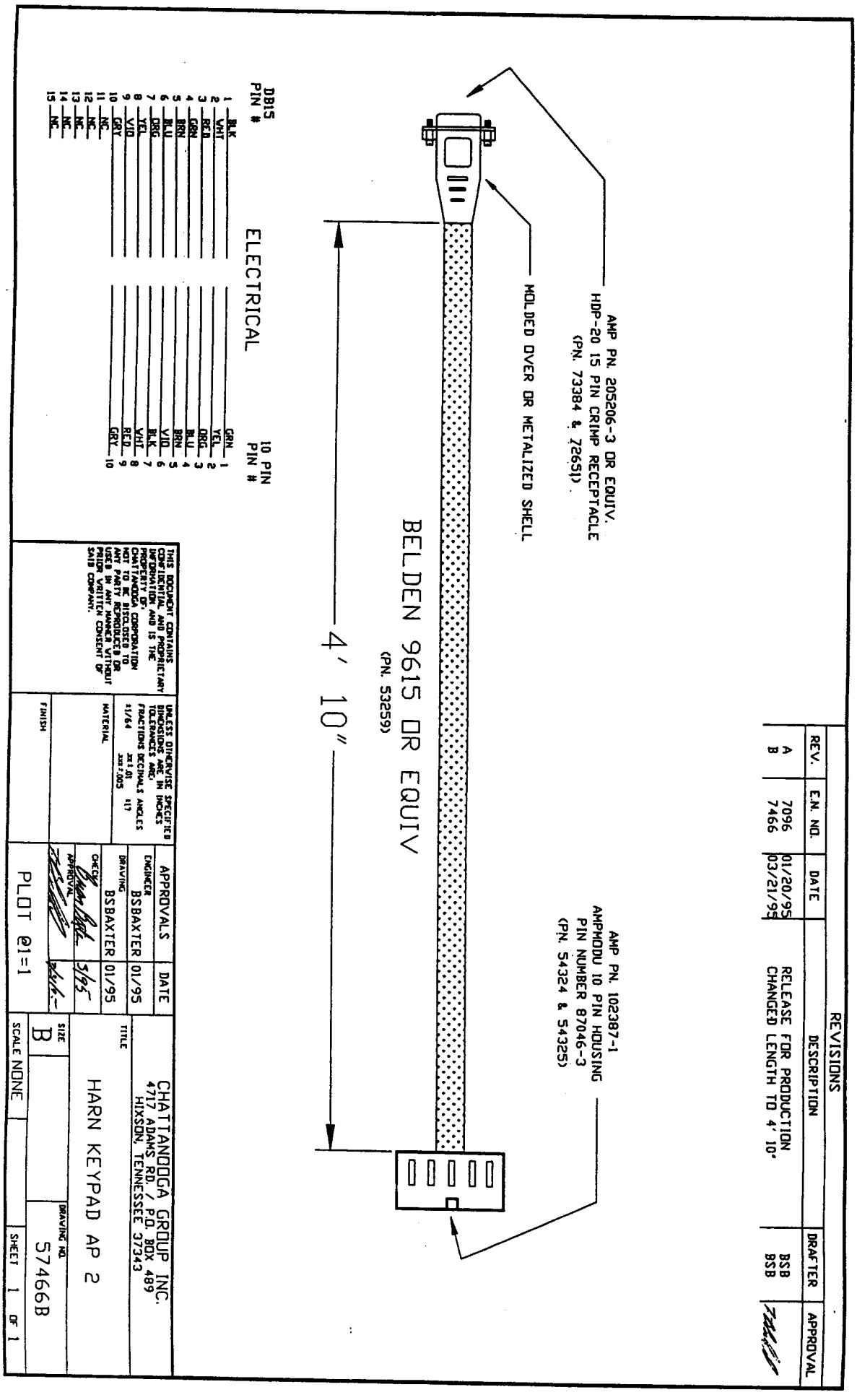
Basic AP Electrical Assembly – 57483

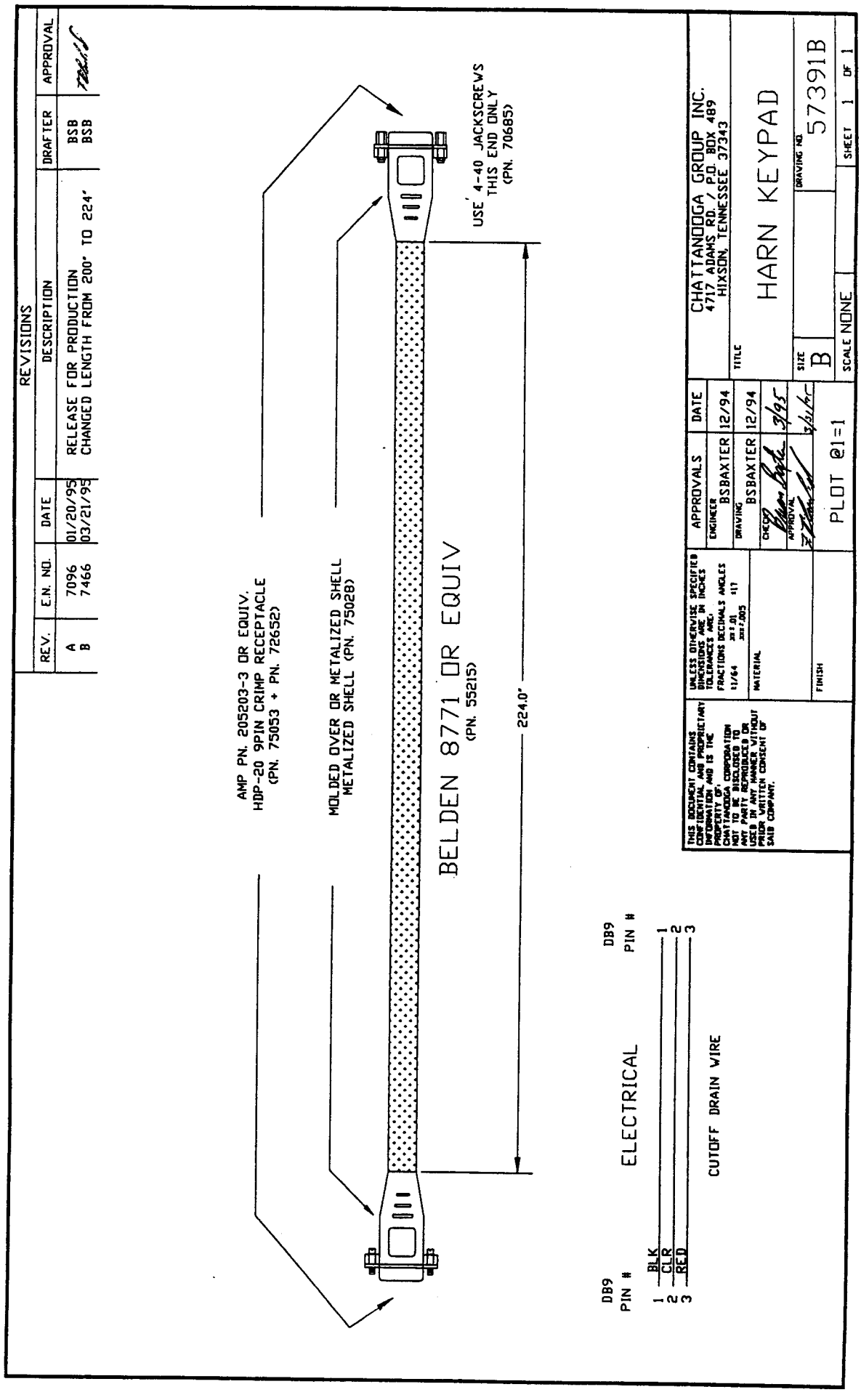


Basic AP Electrical Assembly Parts – 57483

QNTY	PART No.	DESCRIPTION	NOTES
1	57514	Printer Epson 800 Plus	
1	74091	Cable Printer Signal	
1	57330	Powerbox KCMP	
1	57407	Harness Powerbox/Mains	
1	57309	Harness Powerbox Control	
1	57473	CPU Compaq U-100	

AP Keypad Harness – 57466




REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | RELEASE FOR PRODUCTION | BSB
B | 7466 | 03/21/95 | CHANGED LENGTH FROM 200" TO 224" | BSB
AMP PN. 205203-3 OR EQUIV.
HDP-20 9PIN CRIMP RECEPTACLE
(PN. 75053 + PN. 72652)
MOLDED OVER OR METALIZED SHELL
METALIZED SHELL (PN. 75028)
BELDEN 8771 OR EQUIV
(PN. 55215)
224.0"
USE 4-40 JACKSCREWS
THIS END ONLY
(PN. 70685)
DB9 PIN #
ELECTRICAL
1 BLK
2 CLR
3 RED
CUTOFF DRAIN WIRE
DB9 PIN #
1
2
3
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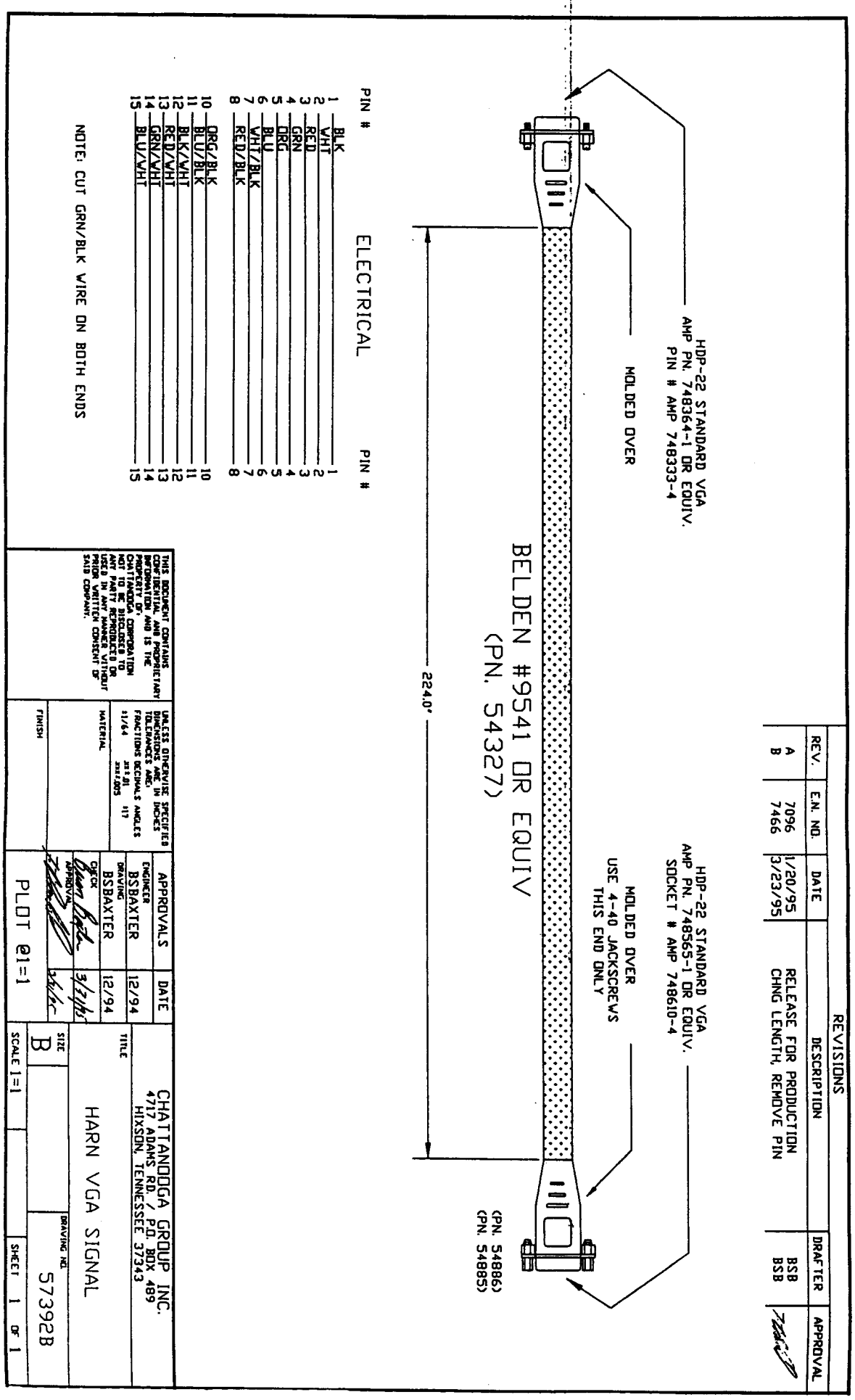
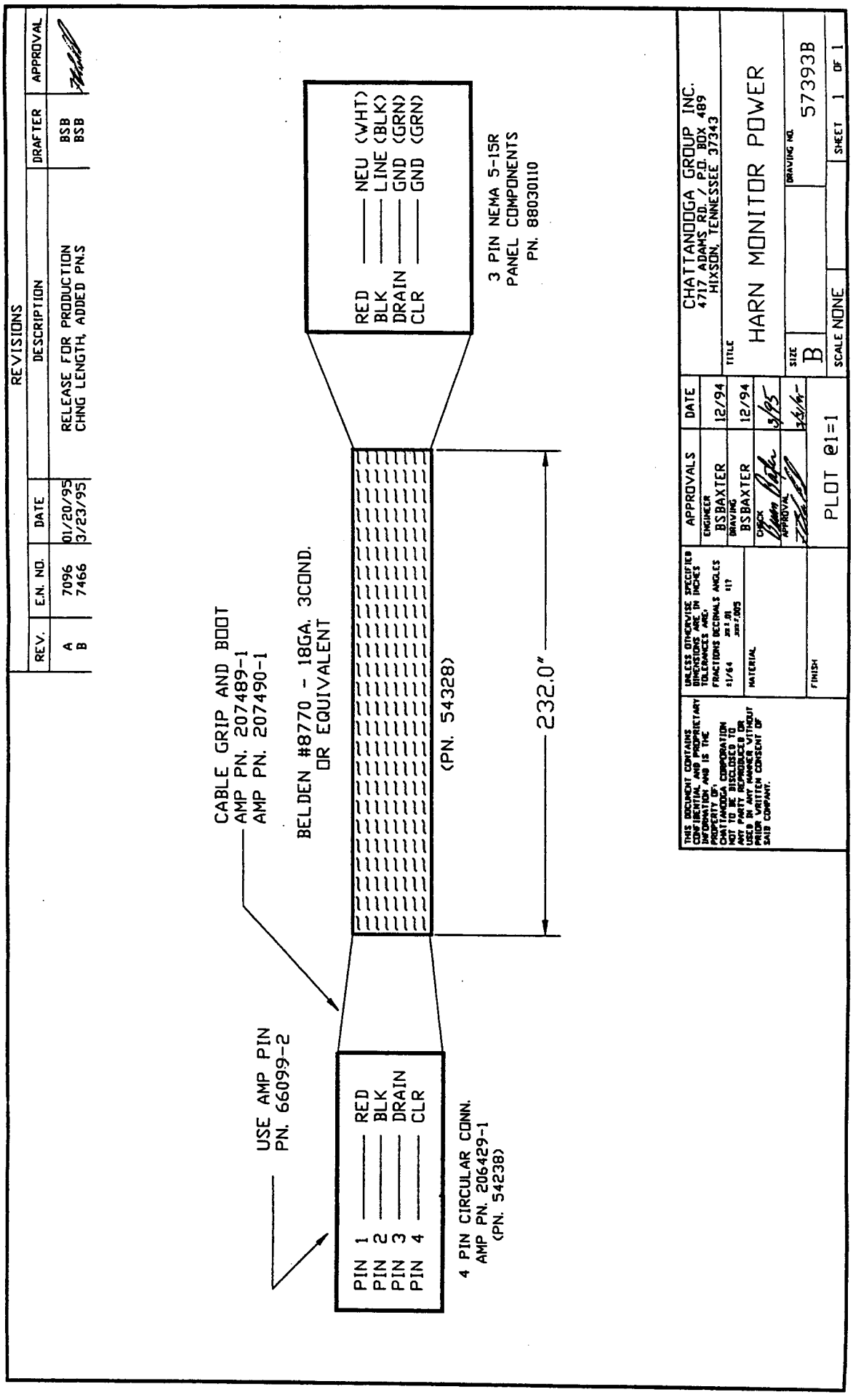
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 .XX ±.01 ±1°
.XXX ±.005
MATERIAL
FINISH
APPROVALS | DATE
ENGINEER BSBAXTER 12/94
DRAWING BSBAXTER 12/94
CHECK 3/95
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARN KEYPAD
SIZE B
DRAWING NO. 57391B
SCALE NONE
SHEET 1 OF 1

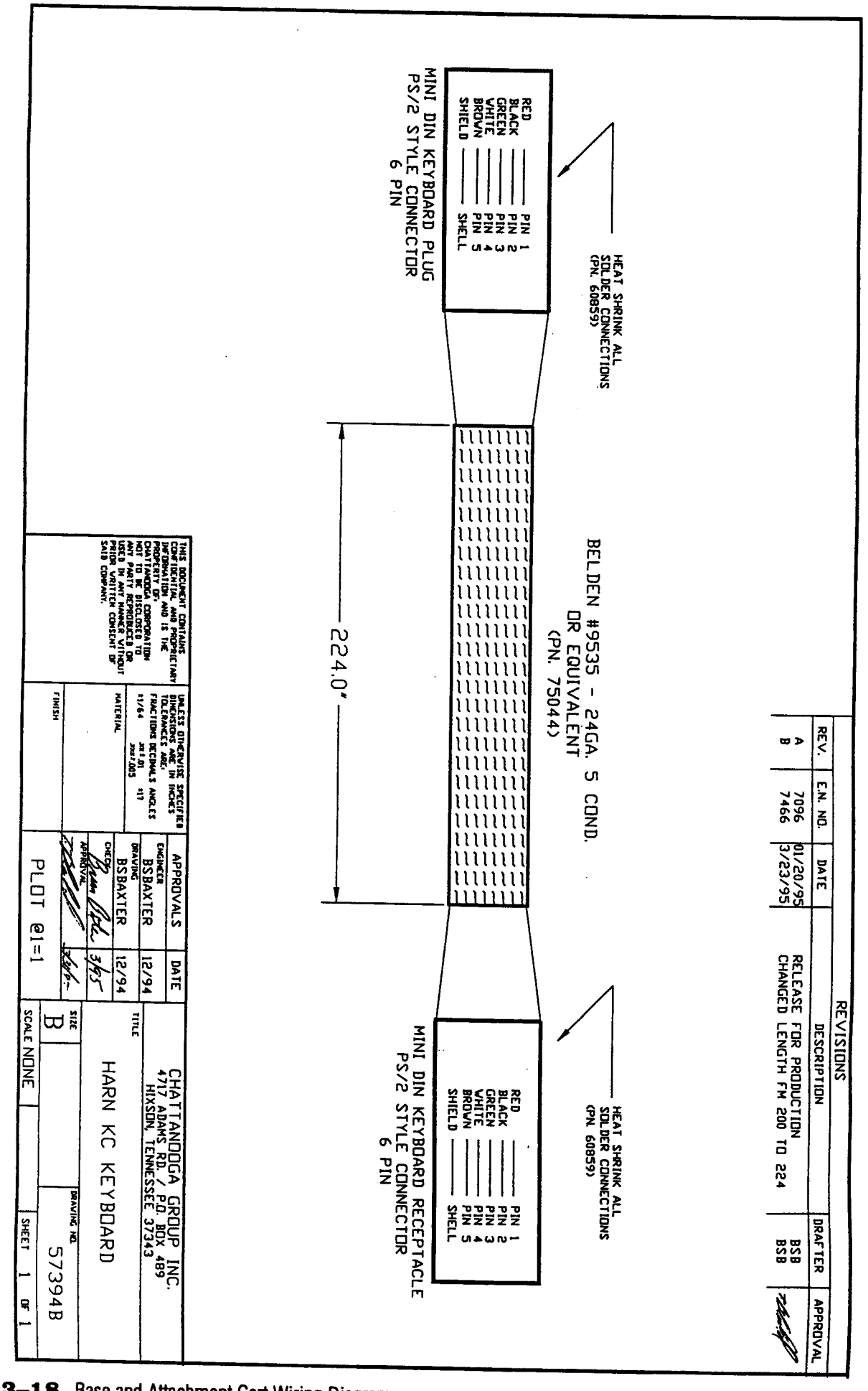
VGA Signal Harness – 57392

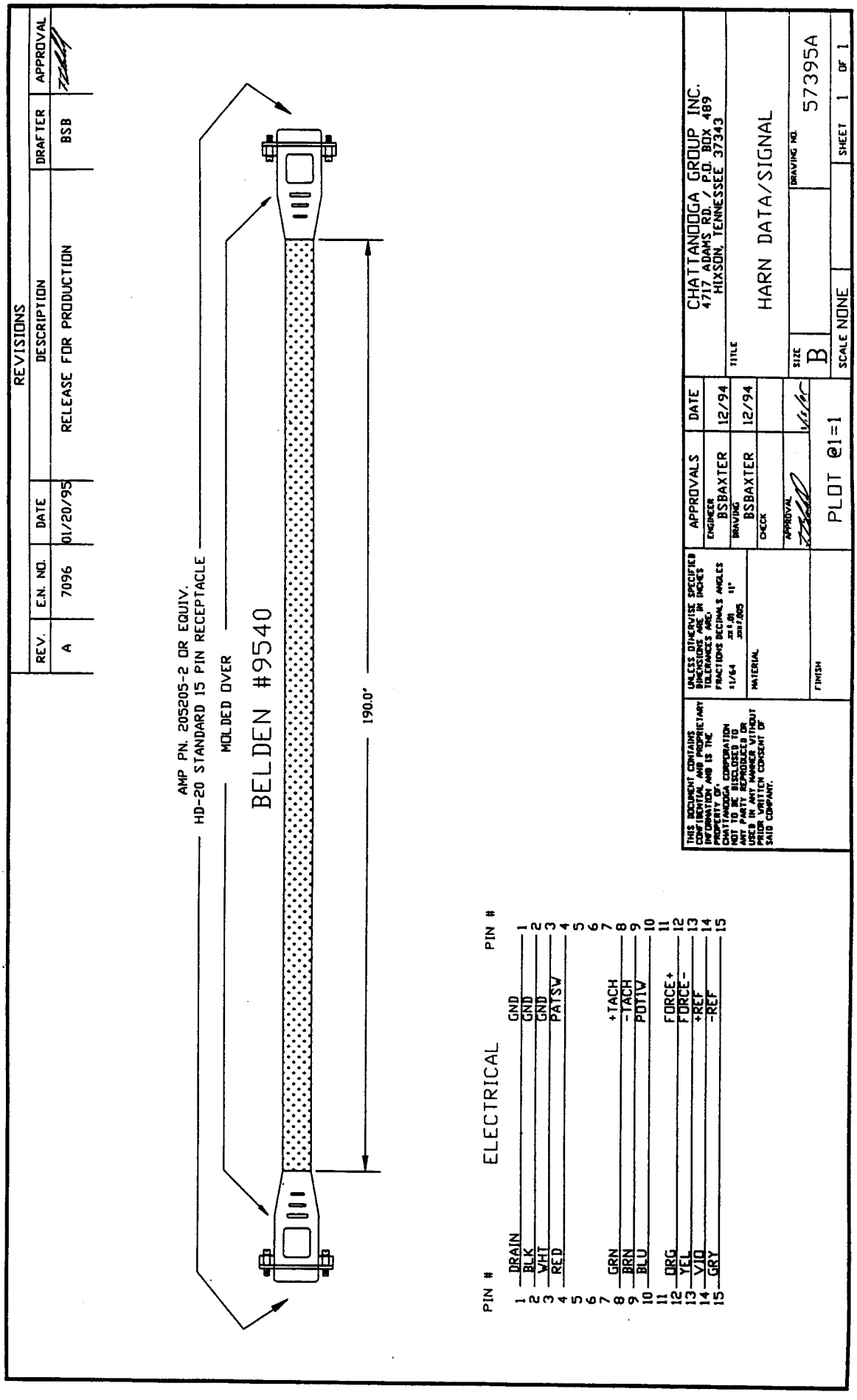


Monitor Power Harness – 57393



Keyboard Harness – 57394




REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | RELEASE FOR PRODUCTION | BSB
AMP PN. 205205-2 OR EQUIV.
HD-20 STANDARD 15 PIN RECEPTACLE
MOLDED OVER
BELDEN #9540
190.0"
PIN # ELECTRICAL PIN #
1 DRAIN GND 1
2 BLK GND 2
3 WHT GND 3
4 RED PATSV 4
5 5
6 6
7 7
8 GRN +TACH 8
9 BRN -TACH 9
10 BLU POTIV 10
11 11
11 ORG FORCE+ 12
12 YEL FORCE- 13
13 VIO +REF 14
14 GRY -REF 15
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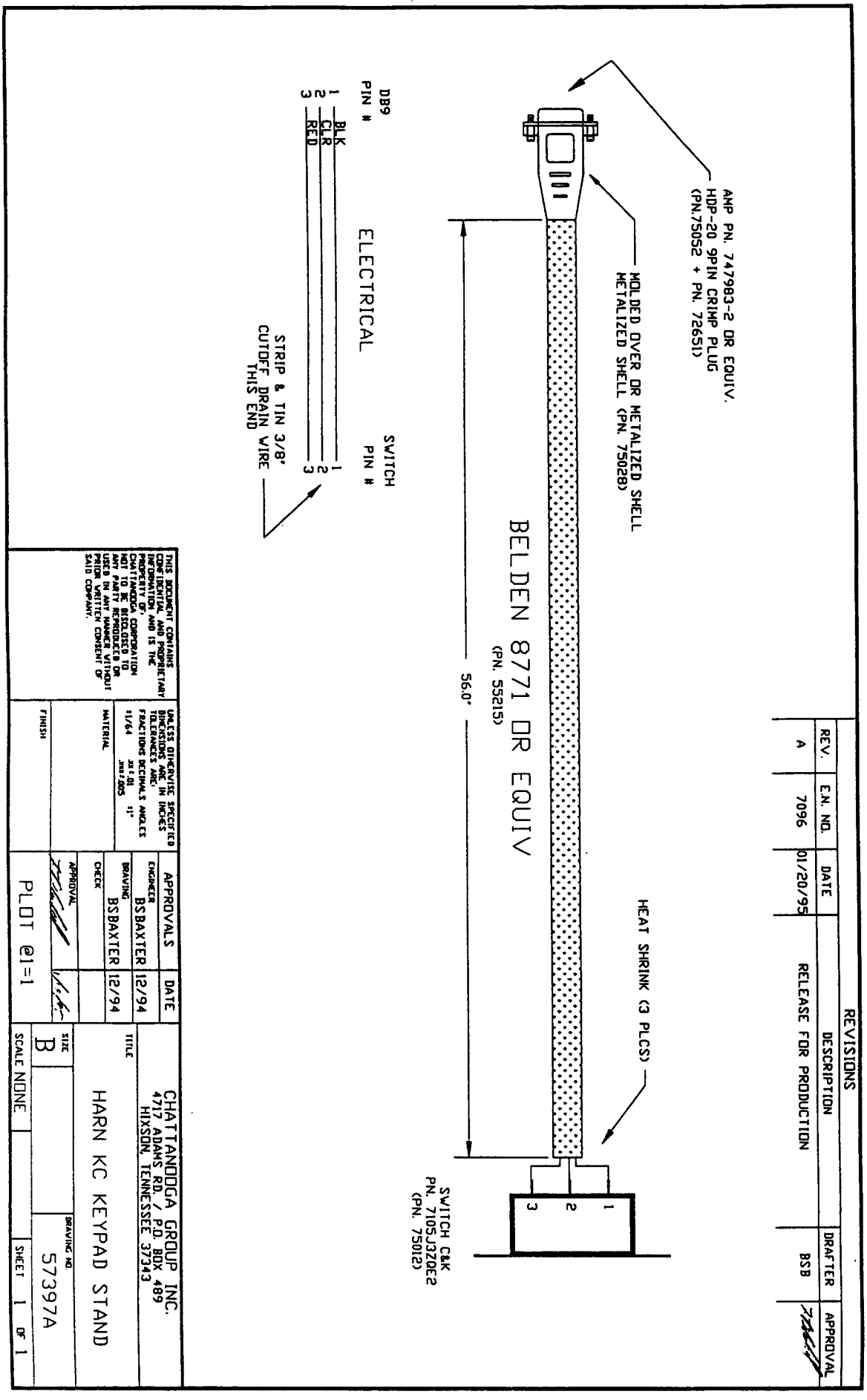
MATERIAL
FINISH
APPROVALS DATE
ENGINEER BSBAXTER 12/94
DRAWING BSBAXTER 12/94
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARN DATA/SIGNAL
SIZE B
DRAWING NO. 57395A
SCALE NONE
SHEET 1 OF 1


AMP PN. 747983-2 OR EQUIV.
HDP-20 9PIN CRIMP PLUG
(PN.75052 + PN. 72651)
MOLDED OVER OR METALIZED SHELL
METALIZED SHELL (PN. 75028)
BELDEN 8771 OR EQUIV
(PN. 55215)
56.0"
HEAT SHRINK (3 PLCS)
SWITCH C&K
PN. 7105J3ZQE2
(PN. 75012)
DB9
PIN #
1 BLK
2 CLR
3 RED
ELECTRICAL
SWITCH
PIN #
1
2
3
STRIP & TIN 3/8"
CUTOFF DRAIN WIRE
THIS END
REVISIONS
REV.
E.N. NO.
DATE
DESCRIPTION
DRAFTER
APPROVAL
A
7096
01/20/95
RELEASE FOR PRODUCTION
BSB
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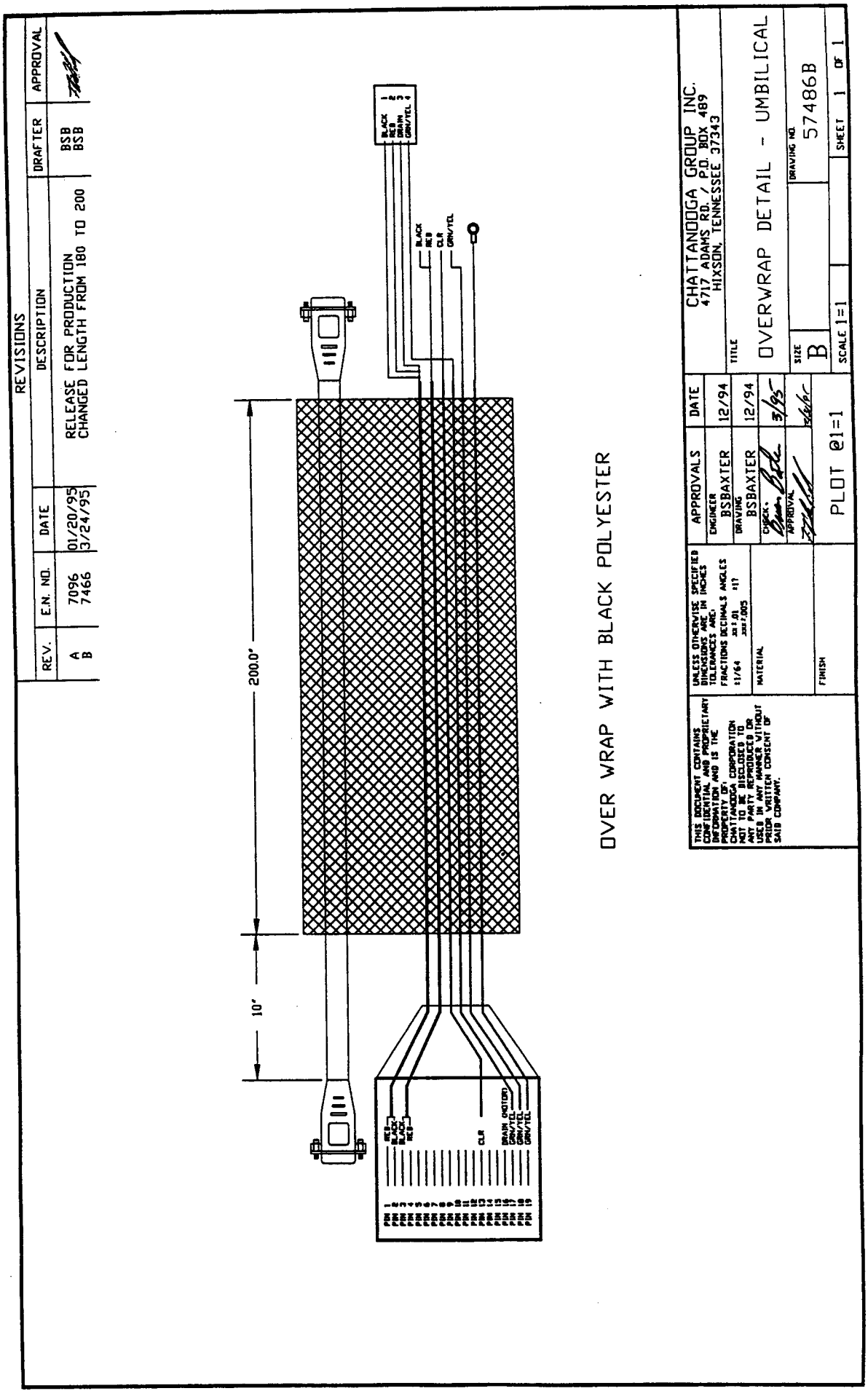
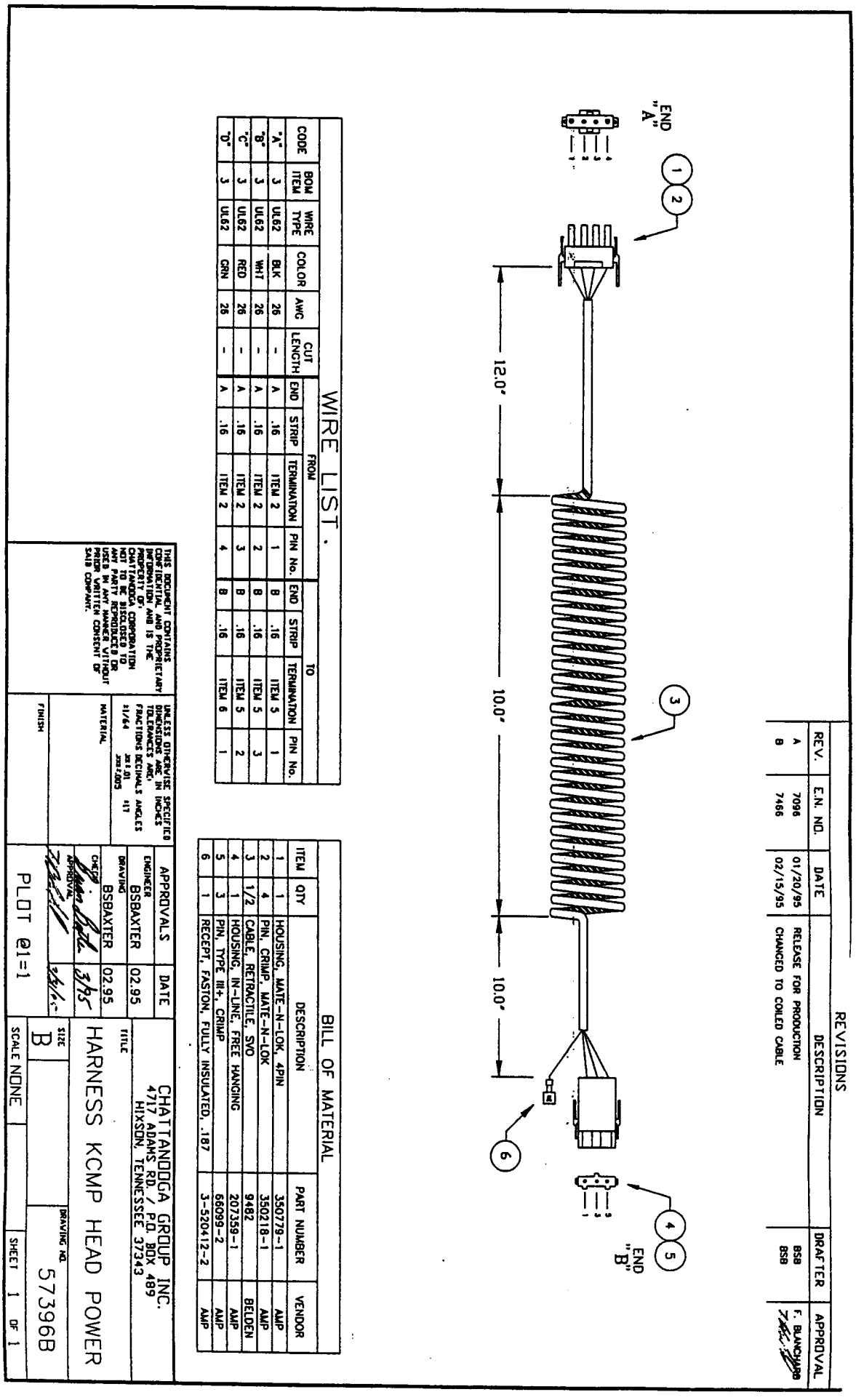
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 ±.01 ±1° .XX±.025
MATERIAL
FINISH
APPROVALS
ENGINEER BSBAXTER 12/94
DRAWING BSBAXTER 12/94
CHECK
APPROVAL
DATE
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARN KC KEYPAD STAND
SIZE
B
DRAWING NO.
57397A
SCALE NONE
SHEET 1 OF 1

Umbilical Overwrap Detail – 57486





REVISIONS

REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01/20/95	RELEASE FOR PRODUCTION	BSB	F. BLANCHARD
B	7466	02/15/95	CHANGED TO COILED CABLE	BSB	

WIRE LIST.

CODE	BOM ITEM	WIRE TYPE	COLOR	AWG	CUT LENGTH	FROM END	FROM STRIP	FROM TERMINATION	FROM PIN No.	TO END	TO STRIP	TO TERMINATION	TO PIN No.
"A"	3	UL62	BLK	26	–	A	.16	ITEM 2	1	B	.16	ITEM 5	1
"B"	3	UL62	WHT	26	–	A	.16	ITEM 2	2	B	.16	ITEM 5	3
"C"	3	UL62	RED	26	–	A	.16	ITEM 2	3	B	.16	ITEM 5	2
"D"	3	UL62	GRN	26	–	A	.16	ITEM 2	4	B	.16	ITEM 6	1

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	PART NUMBER	VENDOR
1	1	HOUSING, MATE-N-LOK, 4PIN	350779-1	AMP
2	4	PIN, CRIMP, MATE-N-LOK	350218-1	AMP
3	1/2	CABLE, RETRACTILE, SVO	9482	BELDEN
4	1	HOUSING, IN-LINE, FREE HANGING	207359-1	AMP
5	3	PIN, TYPE III+, CRIMP	66099-2	AMP
6	1	RECEPT, FASTON, FULLY INSULATED, .187	3-520412-2	AMP

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 XX±.01 ±1°
XXX±.005
MATERIAL
FINISH

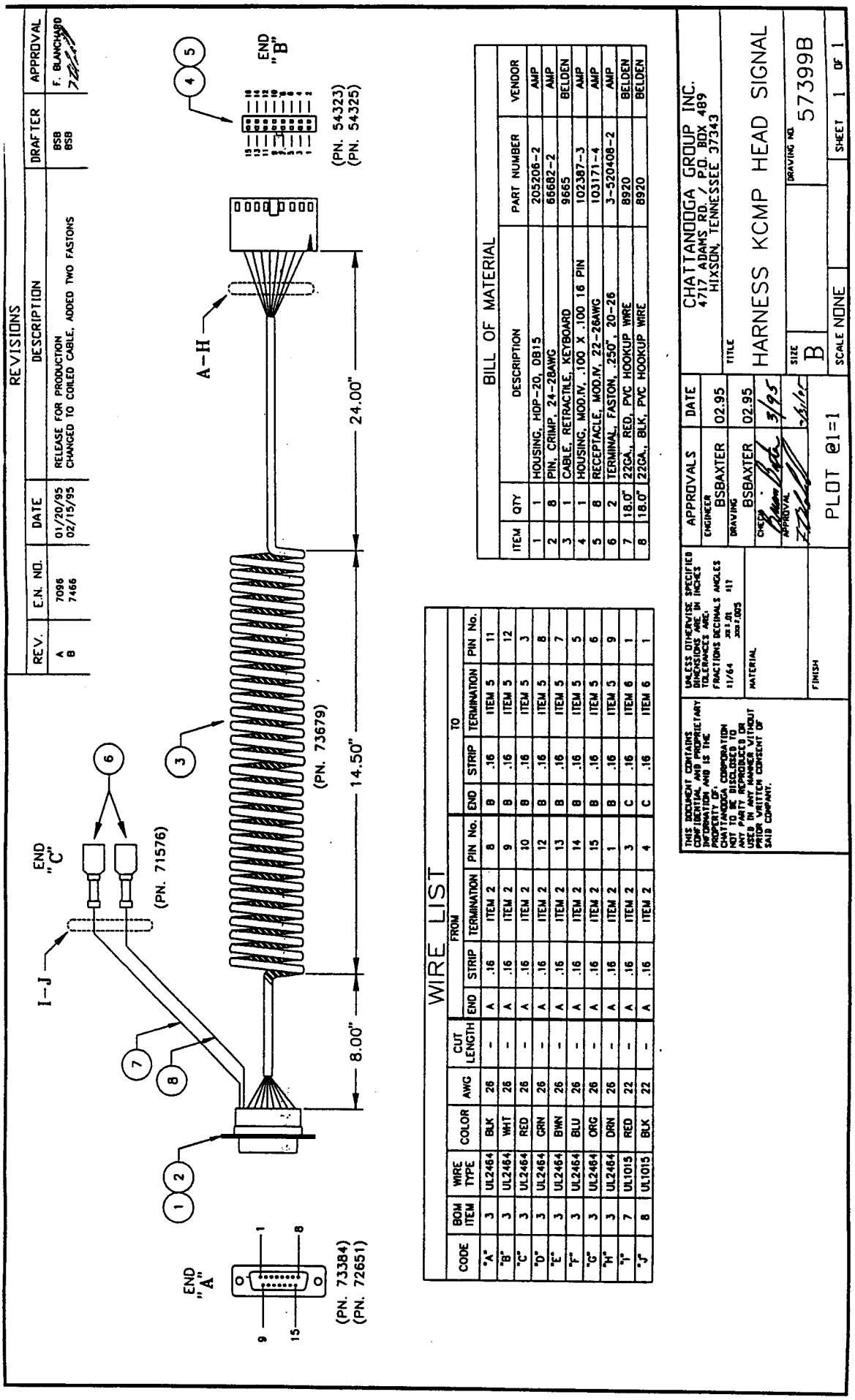
APPROVALS		DATE
ENGINEER	BSBAXTER	02.95
DRAWING	BSBAXTER	02.95
CHECK APPROVAL		

PLOT @1=1

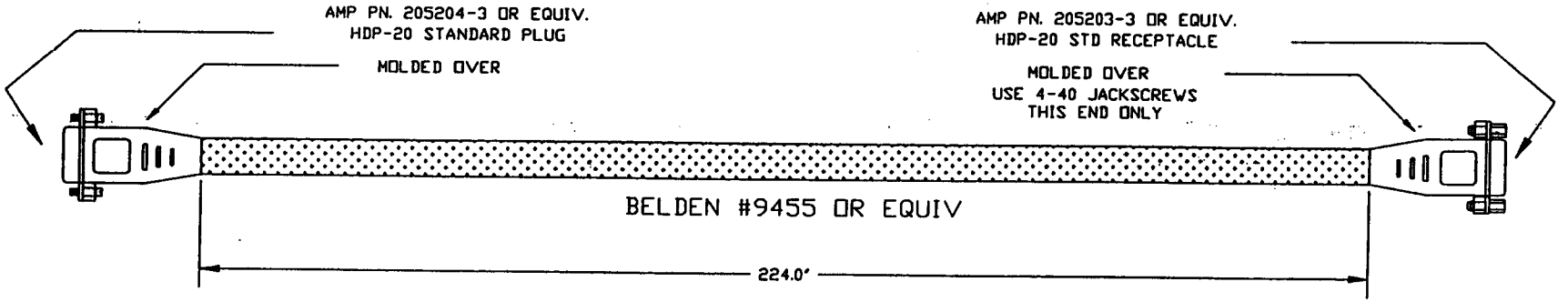
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343

TITLE
HARNESS KCMP HEAD POWER

SIZE	DRAWING NO.
B	57396B
SCALE NONE	SHEET 1 OF 1


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7095 | 01/20/95 | RELEASE FOR PRODUCTION | BSB | F. BLANCHARD
B | 7466 | 02/15/95 | CHANGED TO COILED CABLE, ADDED TWO FASTONS | BSB
BILL OF MATERIAL
ITEM | QTY | DESCRIPTION | PART NUMBER | VENDOR
1 | 1 | HOUSING, HDP-20, 0815 | 205206-2 | AMP
2 | 8 | PIN, CRIMP, 24-28AWG | 66682-2 | AMP
3 | 1 | CABLE, RETRACTILE, KEYBOARD | 9665 | BELDEN
4 | 1 | HOUSING, MOD.IV, .100 X .100 16 PIN | 102387-3 | AMP
5 | 8 | RECEPTACLE, MOD.IV, 22-26AWG | 103171-4 | AMP
6 | 2 | TERMINAL, FASTON, .250", 20-26 | 3-520408-2 | AMP
7 | 18.0" | 22GA., RED, PVC HOOKUP WIRE | 8920 | BELDEN
8 | 18.0" | 22GA., BLK, PVC HOOKUP WIRE | 8920 | BELDEN
WIRE LIST
CODE | BOM ITEM | WIRE TYPE | COLOR | AWG | CUT LENGTH | FROM: END | STRIP | TERMINATION | PIN No. | TO: END | STRIP | TERMINATION | PIN No.
"A" | 3 | UL2464 | BLK | 26 | - | A | .16 | ITEM 2 | 8 | B | .16 | ITEM 5 | 11
"B" | 3 | UL2464 | WHT | 26 | - | A | .16 | ITEM 2 | 9 | B | .16 | ITEM 5 | 12
"C" | 3 | UL2464 | RED | 26 | - | A | .16 | ITEM 2 | 10 | B | .16 | ITEM 5 | 3
"D" | 3 | UL2464 | GRN | 26 | - | A | .16 | ITEM 2 | 12 | B | .16 | ITEM 5 | 8
"E" | 3 | UL2464 | BWN | 26 | - | A | .16 | ITEM 2 | 13 | B | .16 | ITEM 5 | 7
"F" | 3 | UL2464 | BLU | 26 | - | A | .16 | ITEM 2 | 14 | B | .16 | ITEM 5 | 5
"G" | 3 | UL2464 | ORG | 26 | - | A | .16 | ITEM 2 | 15 | B | .16 | ITEM 5 | 6
"H" | 3 | UL2464 | DRN | 26 | - | A | .16 | ITEM 2 | 1 | B | .16 | ITEM 5 | 9
"I" | 7 | UL1015 | RED | 22 | - | A | .16 | ITEM 2 | 3 | C | .16 | ITEM 6 | 1
"J" | 8 | UL1015 | BLK | 22 | - | A | .16 | ITEM 2 | 4 | C | .16 | ITEM 6 | 1
END "A"
(PN. 73384)
(PN. 72651)
END "B"
(PN. 54323)
(PN. 54325)
END "C"
(PN. 71576)
(PN. 73679)
8.00"
14.50"
24.00"
A-H
I-J
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
APPROVALS | DATE
ENGINEER BSBAXTER 02.95
DRAWING BSBAXTER 02.95
CHECK
APPROVAL
TITLE
HARNESS KCMP HEAD SIGNAL
SIZE B
DRAWING NO. 57399B
SCALE NONE
SHEET 1 OF 1
PLOT @1=1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 .XX ±.01 .XXX ±.005
MATERIAL
FINISH
THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION AND IS THE PROPERTY OF CHATTANOOGA CORPORATION NOT TO BE DISCLOSED TO ANY PARTY REPRODUCED OR USED IN ANY MANNER WITHOUT PRIOR WRITTEN CONSENT OF SAID COMPANY.

REVISIONS					
REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01/20/95	RELEASE FOR PRODUCTION	BSB	
B	7466	3/23/95	CHANGED LENGTH FROM 200 TO 224"	BSB	



ELECTRICAL

PIN #		PIN #
1	BLK	1
2	WHT	2
3	RED	3
4	GRN	4
5	BRN	5
6	BLU	6
7	ORG	7
8	YEL	8
9	VIO	9

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UNLESS OTHERVISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 .XX ±.01 ±1°
.XXX ±.005

MATERIAL

FINISH

APPROVALS	DATE
ENGINEER BSBAXTER	12/94
DRAWING BSBAXTER	12/94
CHECK	3/95
APPROVAL	3/6/95

PLOT @1=1

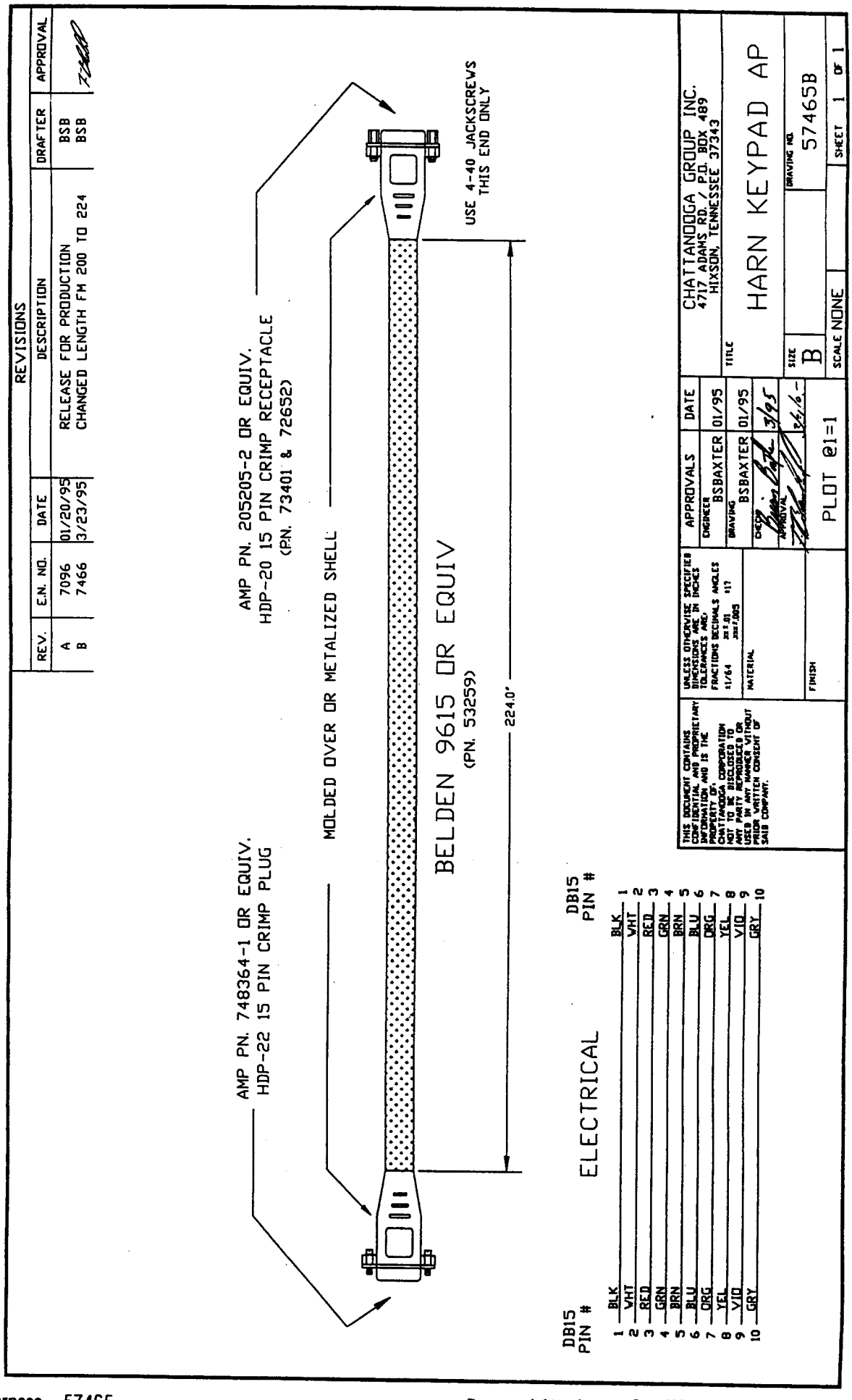
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343

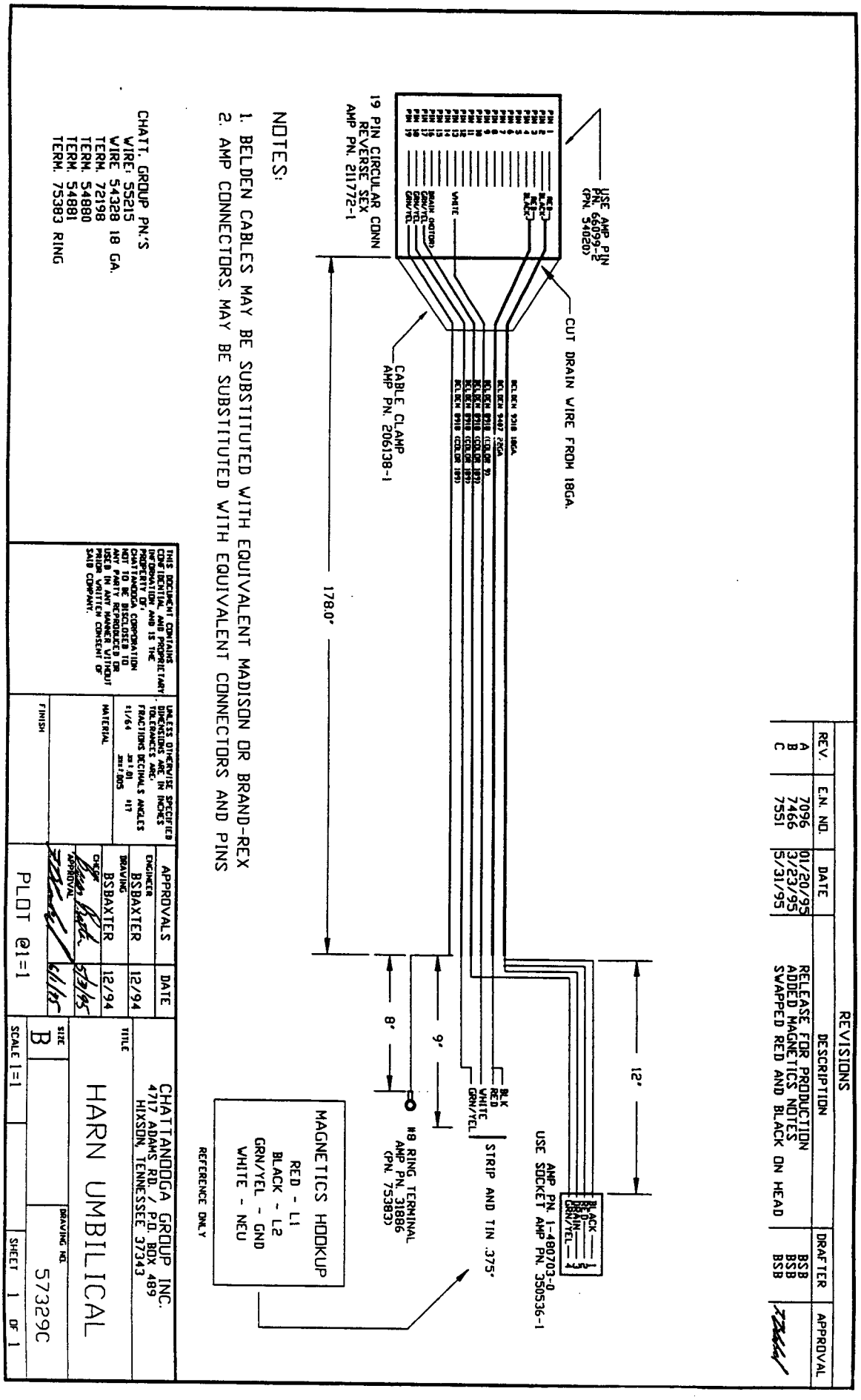
TITLE
HARN TOUCHSCREEN

SIZE B | DRAWING NO. 57477B

SCALE 1=1 | SHEET 1 OF 1

Touchscreen Harness – 57477


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | RELEASE FOR PRODUCTION | BSB
B | 7466 | 3/23/95 | CHANGED LENGTH FM 200 TO 224 | BSB
AMP PN. 748364-1 OR EQUIV.
HDP-22 15 PIN CRIMP PLUG
MOLDED OVER OR METALIZED SHELL
AMP PN. 205205-2 OR EQUIV.
HDP-20 15 PIN CRIMP RECEPTACLE
(PN. 73401 & 72652)
BELDEN 9615 OR EQUIV
(PN. 53259)
224.0"
USE 4-40 JACKSCREWS
THIS END ONLY
DB15 PIN #
ELECTRICAL
DB15 PIN #
1 BLK
2 WHT
3 RED
4 GRN
5 BRN
6 BLU
7 ORG
8 YEL
9 VIO
10 GRY
THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION AND IS THE PROPERTY OF CHATTANOOGA CORPORATION CONTENTS NOT TO BE DISCLOSED TO ANY PARTY REPRODUCED OR USED IN ANY MANNER WITHOUT PRIOR WRITTEN CONSENT OF SAID COMPANY.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES
MATERIAL
FINISH
APPROVALS | DATE
ENGINEER BSBAXTER 01/95
DRAWING BSBAXTER 01/95
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARN KEYPAD AP
SIZE B
DRAWING NO. 57465B
SCALE NONE
SHEET 1 OF 1


REVISIONS
REV. E.N. NO. DATE DESCRIPTION DRAFTER APPROVAL
A 7096 01/20/95 RELEASE FOR PRODUCTION BSB
B 7466 3/23/95 ADDED MAGNETICS NOTES BSB
C 7551 5/31/95 SWAPPED RED AND BLACK ON HEAD BSB
USE AMP PIN P/N 66099-2 (PN. 340201
CUT DRAIN WIRE FROM 18GA.
19 PIN CIRCULAR CONN REVERSE SEX AMP PN. 211772-1
CABLE CLAMP AMP PN. 206138-1
178.0"
8"
9"
12"
BLACK
RED
WHITE
GRN/YEL
USE SOCKET AMP PN. 350536-1
AMP PN. 1-480703-0
BLK
RED
WHITE
GRN/YEL
STRIP AND TIN .375"
#8 RING TERMINAL AMP PN. 31886 (PN. 75383)
MAGNETICS HOOKUP
RED - L1
BLACK - L2
GRN/YEL - GND
WHITE - NEU
REFERENCE ONLY
NOTES:
1. BELDEN CABLES MAY BE SUBSTITUTED WITH EQUIVALENT MADISON OR BRAND-REX
2. AMP CONNECTORS MAY BE SUBSTITUTED WITH EQUIVALENT CONNECTORS AND PINS
CHATT. GROUP PN.'S
WIRE: 55215
WIRE 54328 18 GA.
TERM. 72198
TERM. 54880
TERM. 54881
TERM. 75383 RING
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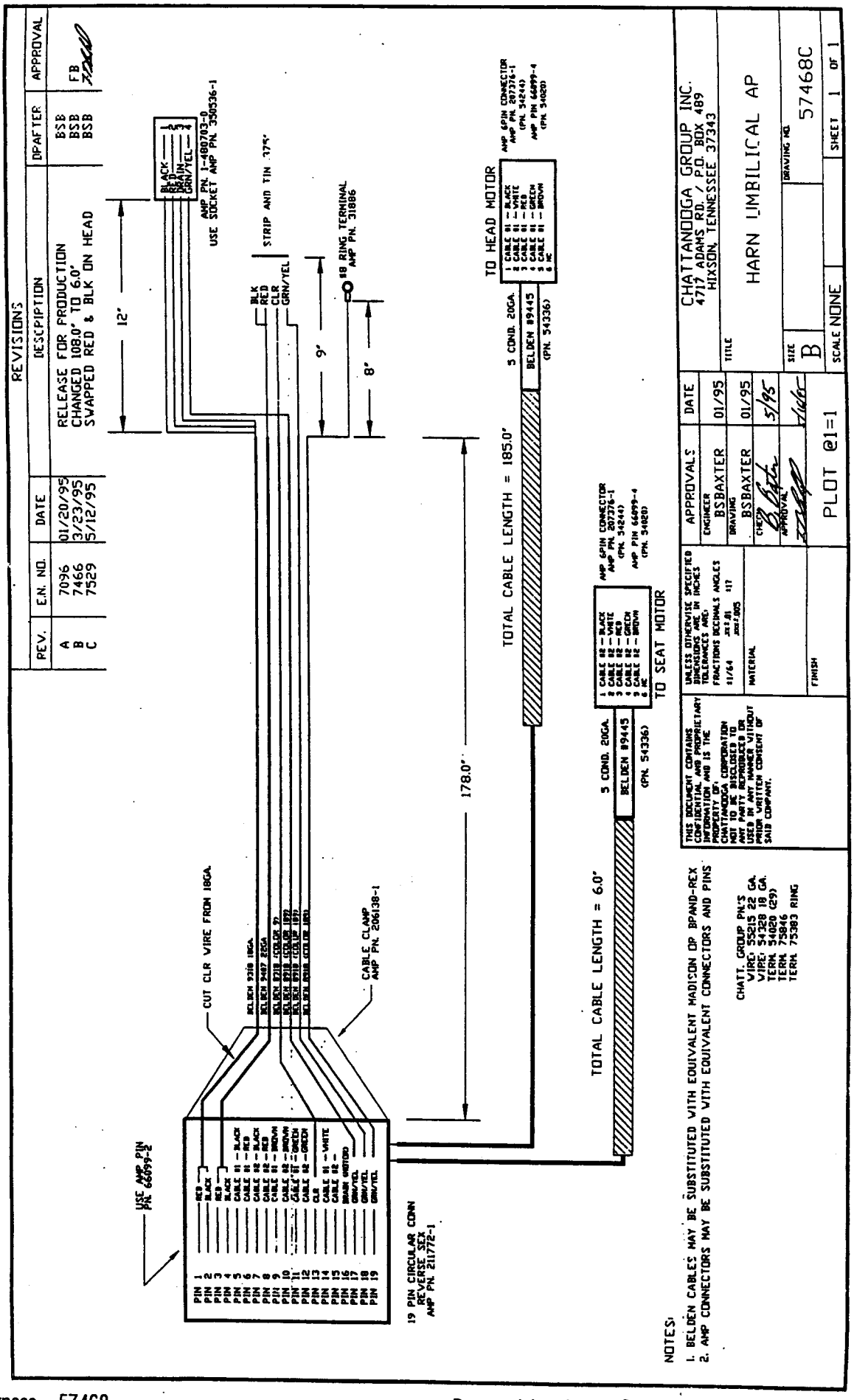
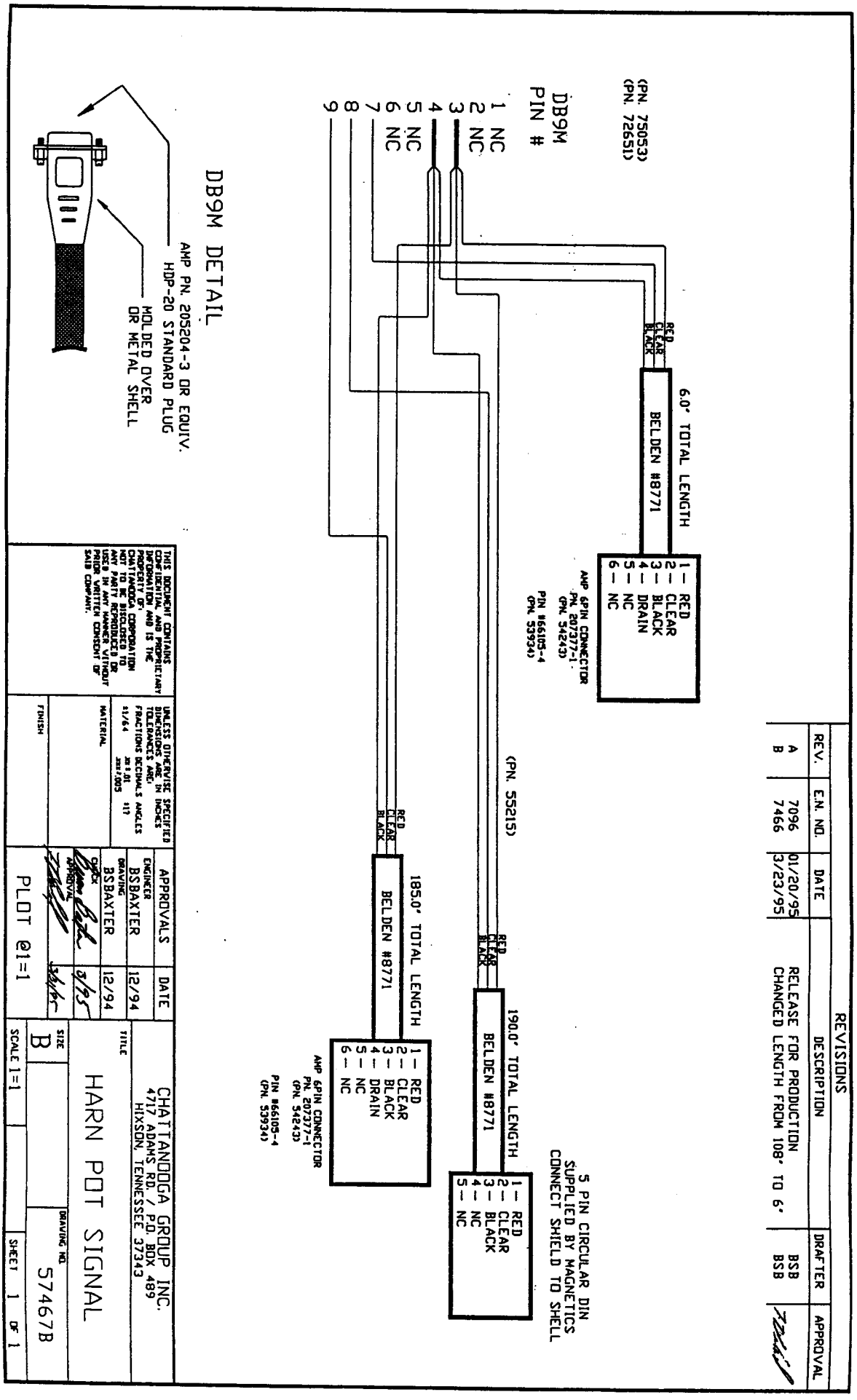
MATERIAL
FINISH
APPROVALS DATE
ENGINEER BSBAXTER 12/94
DRAWING BSBAXTER 12/94
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARN UMBILICAL
SIZE B
DRAWING NO. 57329C
SCALE 1=1
SHEET 1 OF 1


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | RELEASE FOR PRODUCTION | BSB | FB
B | 7466 | 3/23/95 | CHANGED 108.0" TO 6.0" | BSB |
C | 7529 | 5/12/95 | SWAPPED RED & BLK ON HEAD | BSB |
TO HEAD MOTOR
TO SEAT MOTOR
TOTAL CABLE LENGTH = 185.0"
TOTAL CABLE LENGTH = 6.0"
178.0"
12"
9"
8"
5 COND. 20GA.
BELDEN 89445
(PN. 54336)
STRIP AND TIN .375"
BLK
RED
CLR
GRN/YEL
AMP PN. 1-480703-0
USE SOCKET AMP PN. 350536-1
#8 RING TERMINAL
AMP PN. 31886
AMP 6PIN CONNECTOR
AMP PN. 207376-1
(PN. 54244)
AMP PIN 66099-4
(PN. 54020)
CABLE CLAMP
AMP PN. 206138-1
CUT CLR WIRE FROM 18GA.
USE AMP PIN
PN. 66099-2
19 PIN CIRCULAR CONN
REVERSE SEX
AMP PN. 211772-1
PIN 1 RED
PIN 2 BLACK
PIN 3 RED
PIN 4 BLACK
PIN 5 CABLE #1 – BLACK
PIN 6 CABLE #2 – BLACK
PIN 7 CABLE #1 – RED
PIN 8 CABLE #2 – RED
PIN 9 CABLE #1 – BROWN
PIN 10 CABLE #2 – BROWN
PIN 11 CABLE #1 – GREEN
PIN 12 CABLE #2 – GREEN
PIN 13 CLR
PIN 14 CABLE #1 – WHITE
PIN 15 CABLE #2 – WHITE
PIN 16 BRAID SHIELD
PIN 17 GRN/YEL
PIN 18 GRN/YEL
PIN 19 GRN/YEL
CHATTANOOGA GROUP INC.
4719 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
HARN UMBILICAL AP
57468C
SIZE B
SCALE NONE
SHEET 1 OF 1
PLOT @1=1
APPROVALS
ENGINEER BSBAXTER 01/95
DRAWING BSBAXTER 01/95
CHECK
APPROVAL
NOTES:
1. BELDEN CABLES MAY BE SUBSTITUTED WITH EQUIVALENT MADISON OR BRAND-REX
2. AMP CONNECTORS MAY BE SUBSTITUTED WITH EQUIVALENT CONNECTORS AND PINS
CHATT. GROUP PN'S
WIRE 55215 22 GA.
WIRE 54328 18 GA.
TERM. 54020 (29)
TERM. 75846
TERM. 75383 RING


REVISIONS
REV. E.N. NO. DATE DESCRIPTION DRAFTER APPROVAL
A 7096 01/20/95 RELEASE FOR PRODUCTION BSB
B 7466 3/23/95 CHANGED LENGTH FROM 108" TO 6' BSB
(PN. 75053)
(PN. 72651)
RED
CLEAR
BLACK
6.0" TOTAL LENGTH
BELDEN #8771
1 -- RED
2 -- CLEAR
3 -- BLACK
4 -- DRAIN
5 -- NC
6 -- NC
AMP 6PIN CONNECTOR
PN. 207377-1
(PN. 54243)
PIN #66105-4
(PN. 53934)
DB9M
PIN #
1 NC
2 NC
3
4
5 NC
6 NC
7
8
9
(PN. 55215)
185.0" TOTAL LENGTH
BELDEN #8771
1 -- RED
2 -- CLEAR
3 -- BLACK
4 -- DRAIN
5 -- NC
6 -- NC
AMP 6PIN CONNECTOR
PN. 207377-1
(PN. 54243)
PIN #66105-4
(PN. 53934)
190.0" TOTAL LENGTH
BELDEN #8771
1 -- RED
2 -- CLEAR
3 -- BLACK
4 -- NC
5 -- NC
5 PIN CIRCULAR DIN
SUPPLIED BY MAGNETICS
CONNECT SHIELD TO SHELL
DB9M DETAIL
AMP PN. 205204-3 OR EQUIV.
HDP-20 STANDARD PLUG
MOLDED OVER
OR METAL SHELL
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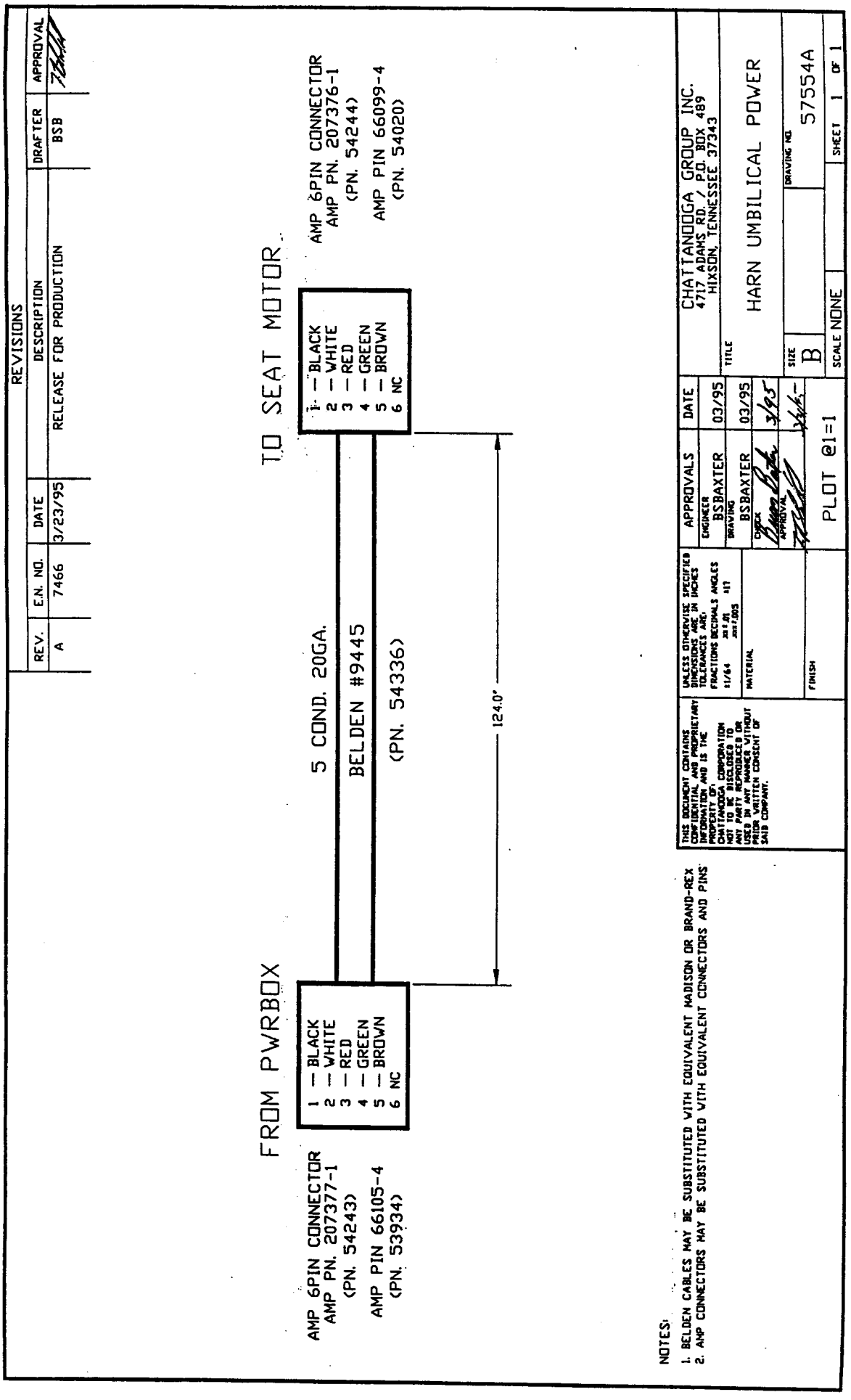
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES 1/64 .XX ±.01 .XXX ±.005 1°
MATERIAL
FINISH
APPROVALS DATE
ENGINEER BSBAXTER 12/94
DRAWING BSBAXTER 12/94
QUICK APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARN POT SIGNAL
SIZE B
DRAWING NO. 57467B
SCALE 1=1
SHEET 1 OF 1


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7466 | 3/23/95 | RELEASE FOR PRODUCTION | BSB
FROM PWRBOX
AMP 6PIN CONNECTOR
AMP PN. 207377-1
(PN. 54243)
AMP PIN 66105-4
(PN. 53934)
1 — BLACK
2 — WHITE
3 — RED
4 — GREEN
5 — BROWN
6 NC
5 COND. 20GA.
BELDEN #9445
(PN. 54336)
124.0"
TO SEAT MOTOR
AMP 6PIN CONNECTOR
AMP PN. 207376-1
(PN. 54244)
AMP PIN 66099-4
(PN. 54020)
1 — BLACK
2 — WHITE
3 — RED
4 — GREEN
5 — BROWN
6 NC
NOTES:
1. BELDEN CABLES MAY BE SUBSTITUTED WITH EQUIVALENT MADISON OR BRAND-REX
2. AMP CONNECTORS MAY BE SUBSTITUTED WITH EQUIVALENT CONNECTORS AND PINS
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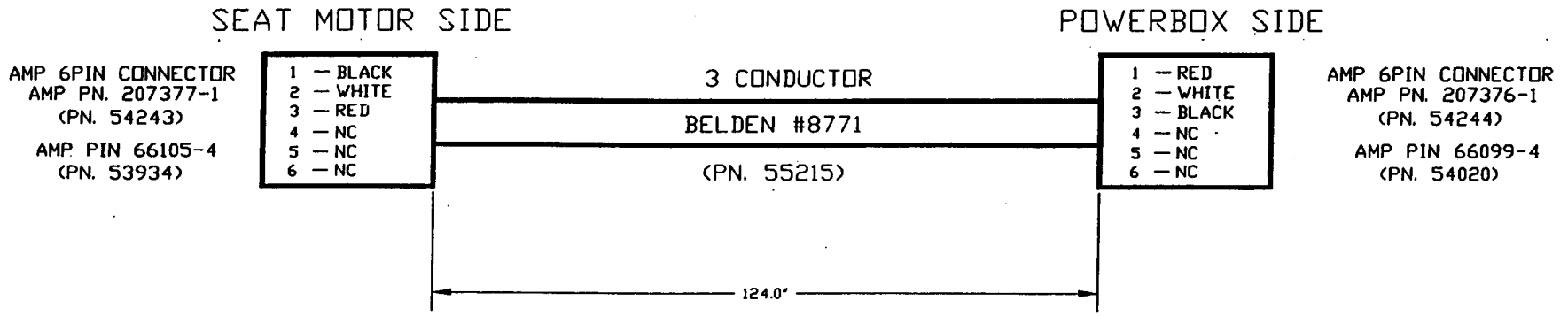
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES
MATERIAL
FINISH
APPROVALS | DATE
ENGINEER BSBAXTER 03/95
DRAWING BSBAXTER 03/95
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARN UMBILICAL POWER
SIZE B
DRAWING NO. 57554A
SCALE NONE
SHEET 1 OF 1

REVISIONS					
REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7466	3/23/95	RELEASE FOR PRODUCTION	BSB	FB
B	7529	5/12/95	SWAPPED RED & BLK WIRES	BSB	



NOTES:

1. BELDEN CABLES MAY BE SUBSTITUTED WITH EQUIVALENT MADISON OR BRAND-REX
2. AMP CONNECTORS MAY BE SUBSTITUTED WITH EQUIVALENT CONNECTORS AND PINS

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 .XX±.01 ±1°
.XXX±.005

MATERIAL

FINISH

APPROVALS	DATE
ENGINEER BSBAXTER	03/95
DRAWING BSBAXTER	03/95
CHECK	5/95
APPROVAL	5/16/95

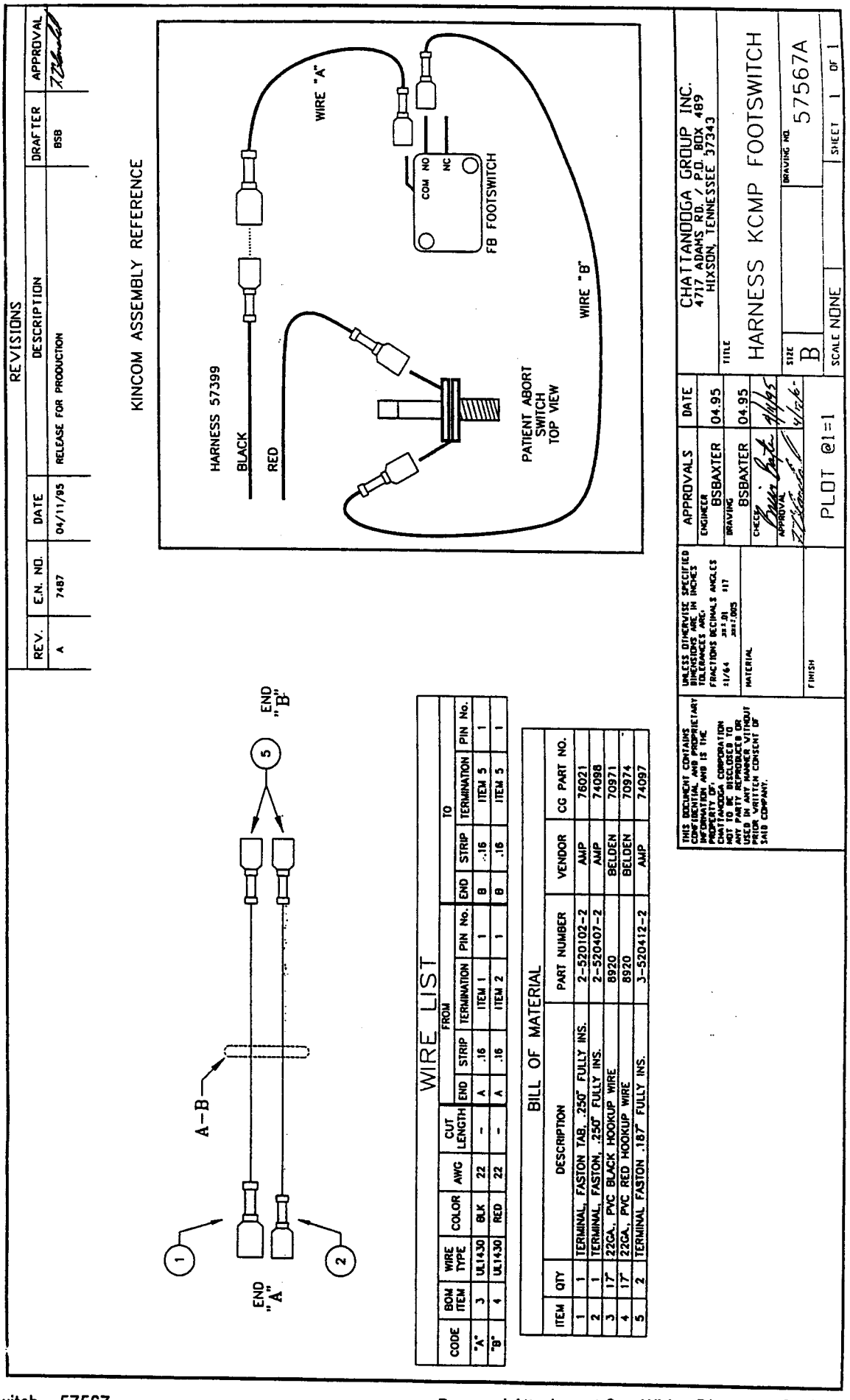
PLOT @1=1

CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343

TITLE: HARN UMBILICAL SIGNAL

SIZE B | DRAWING NO. 57555B

SCALE NONE | SHEET 1 OF 1


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7487 | 04/11/95 | RELEASE FOR PRODUCTION | BSB
KINCOM ASSEMBLY REFERENCE
HARNESS 57399
BLACK
RED
WIRE "A"
WIRE "B"
COM NO NC
FB FOOTSWITCH
PATIENT ABORT SWITCH TOP VIEW
END "A"
END "B"
A-B
WIRE LIST
CODE | BOM ITEM | WIRE TYPE | COLOR | AWG | CUT LENGTH | FROM END | FROM STRIP | FROM TERMINATION | FROM PIN No. | TO END | TO STRIP | TO TERMINATION | TO PIN No.
"A" | 3 | UL1430 | BLK | 22 | - | A | .16 | ITEM 1 | 1 | B | .16 | ITEM 5 | 1
"B" | 4 | UL1430 | RED | 22 | - | A | .16 | ITEM 2 | 1 | B | .16 | ITEM 5 | 1
BILL OF MATERIAL
ITEM | QTY | DESCRIPTION | PART NUMBER | VENDOR | CG PART NO.
1 | 1 | TERMINAL, FASTON TAB, .250" FULLY INS. | 2-520102-2 | AMP | 76021
2 | 1 | TERMINAL, FASTON, .250" FULLY INS. | 2-520407-2 | AMP | 74098
3 | 17" | 22GA. PVC BLACK HOOKUP WIRE | 8920 | BELDEN | 70971
4 | 17" | 22GA. PVC RED HOOKUP WIRE | 8920 | BELDEN | 70974
5 | 2 | TERMINAL FASTON .187" FULLY INS. | 3-520412-2 | AMP | 74097
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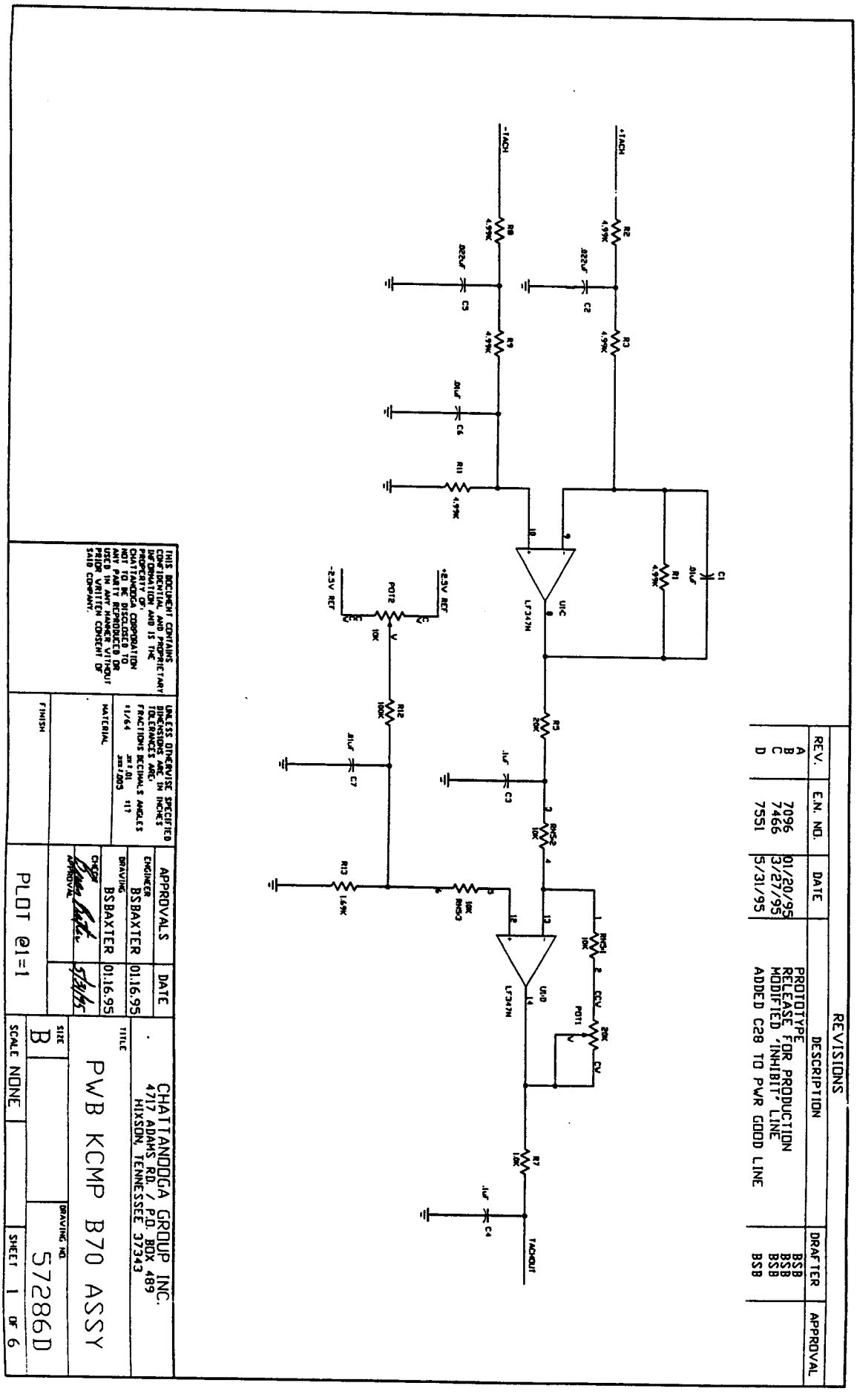
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES 1/64 ±.01 ±1° ±.005
MATERIAL
FINISH
APPROVALS | DATE
ENGINEER BSBAXTER 04.95
DRAWING BSBAXTER 04.95
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC. 4717 ADAMS RD. / P.O. BOX 489 HIXSON, TENNESSEE 37343
TITLE
HARNESS KCMP FOOTSWITCH
SIZE B
DRAWING NO. 57567A
SCALE NONE
SHEET 1 OF 1

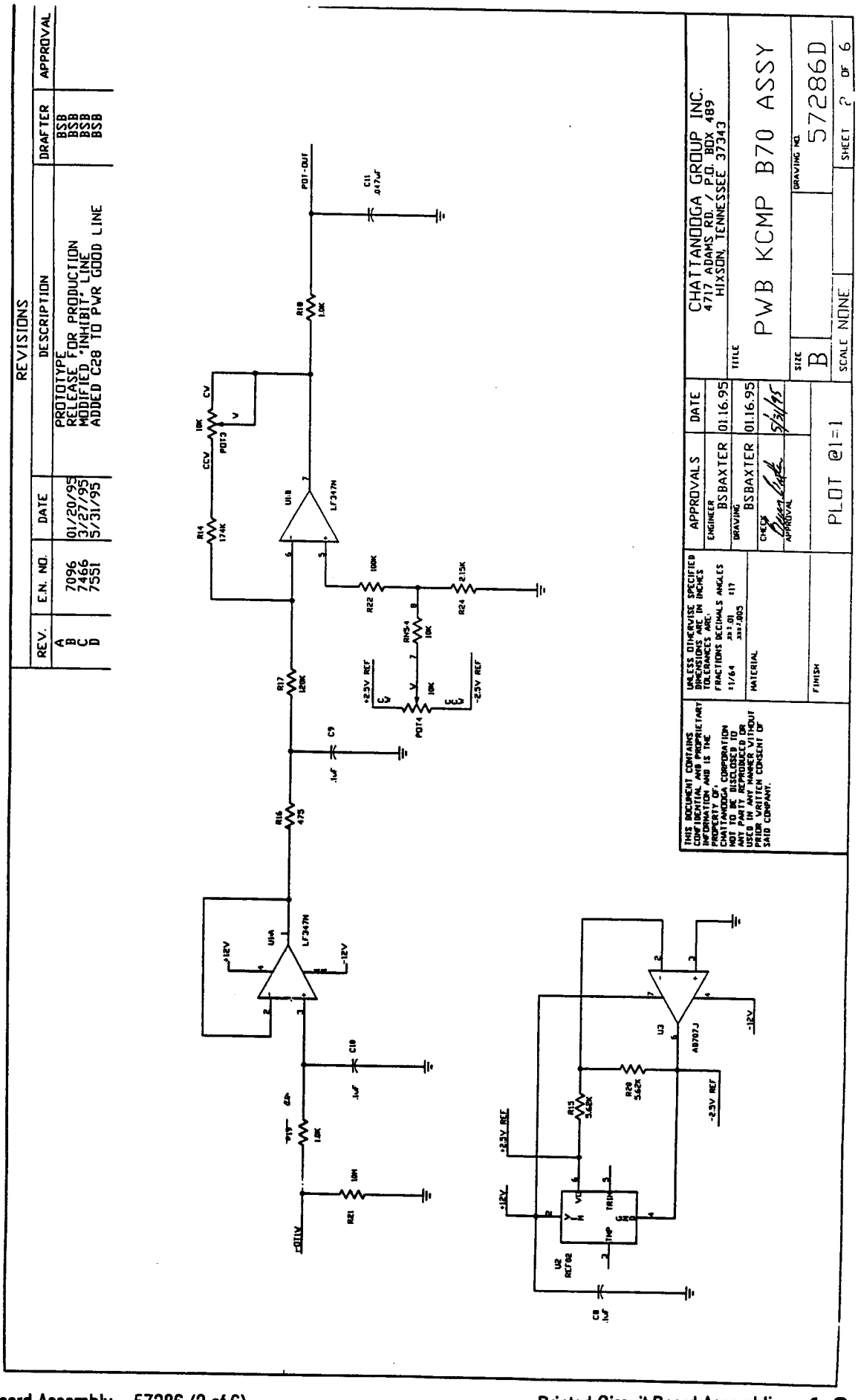
SECTION

4

Printed Circuit Board Assemblies

MP B70 Power Board Assembly – 57286 (1 of 6)




REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | PROTOTYPE | BSB
B | 7466 | 3/27/95 | RELEASE FOR PRODUCTION | BSB
C | 7551 | 5/31/95 | MODIFIED 'INHIBIT' LINE | BSB
D | | | ADDED C28 TO PWR GOOD LINE | BSB
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
APPROVALS | DATE
ENGINEER BSBAXTER 01.16.95
DRAWING BSBAXTER 01.16.95
CHECK APPROVAL
TITLE
PWB KCMP B70 ASSY
SIZE B
DRAWING NO 57286D
SCALE NONE
SHEET 2 OF 6
PLOT @1=1
FINISH
MATERIAL
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 ±.01 ±1°
.XXX ±.005
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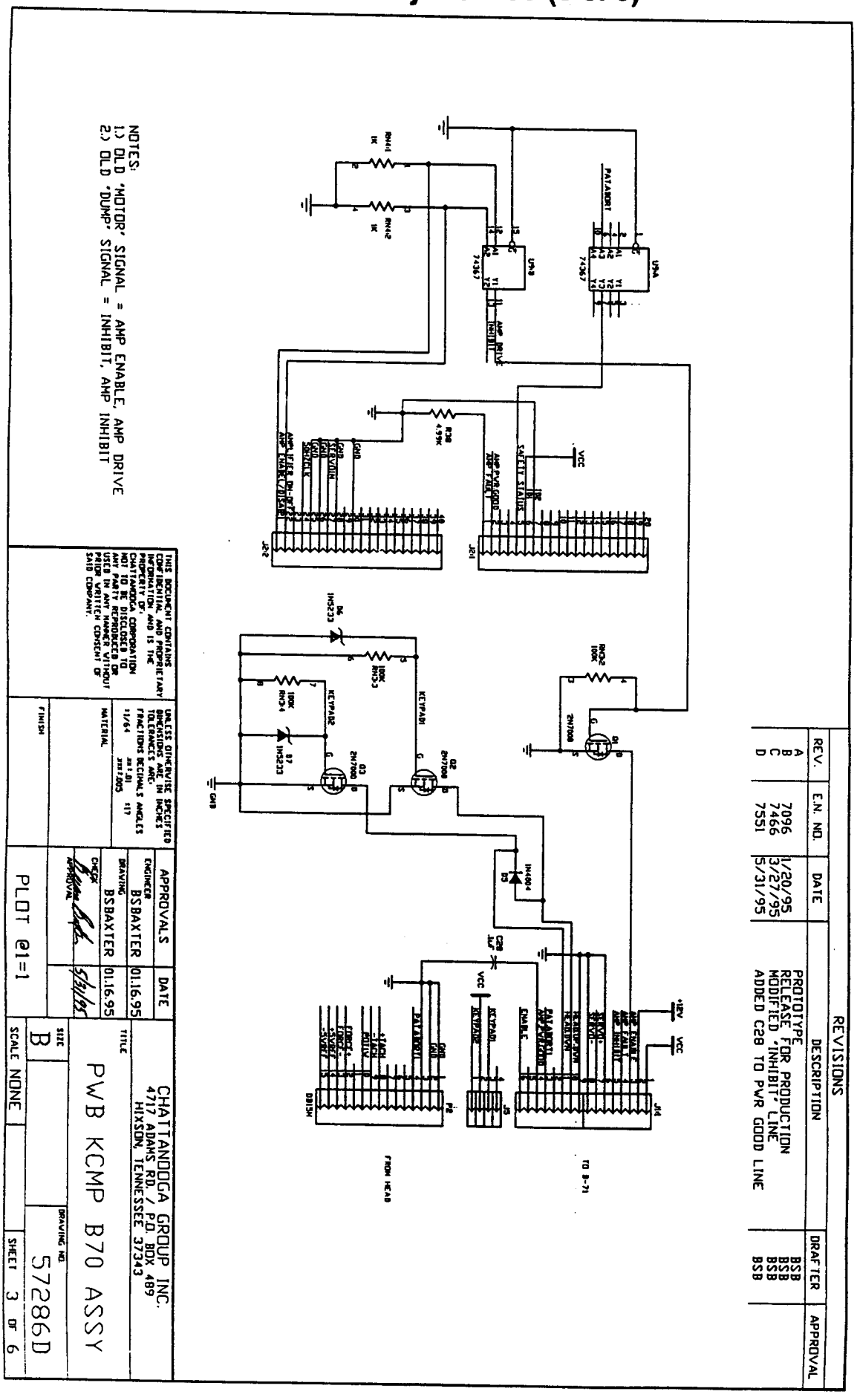
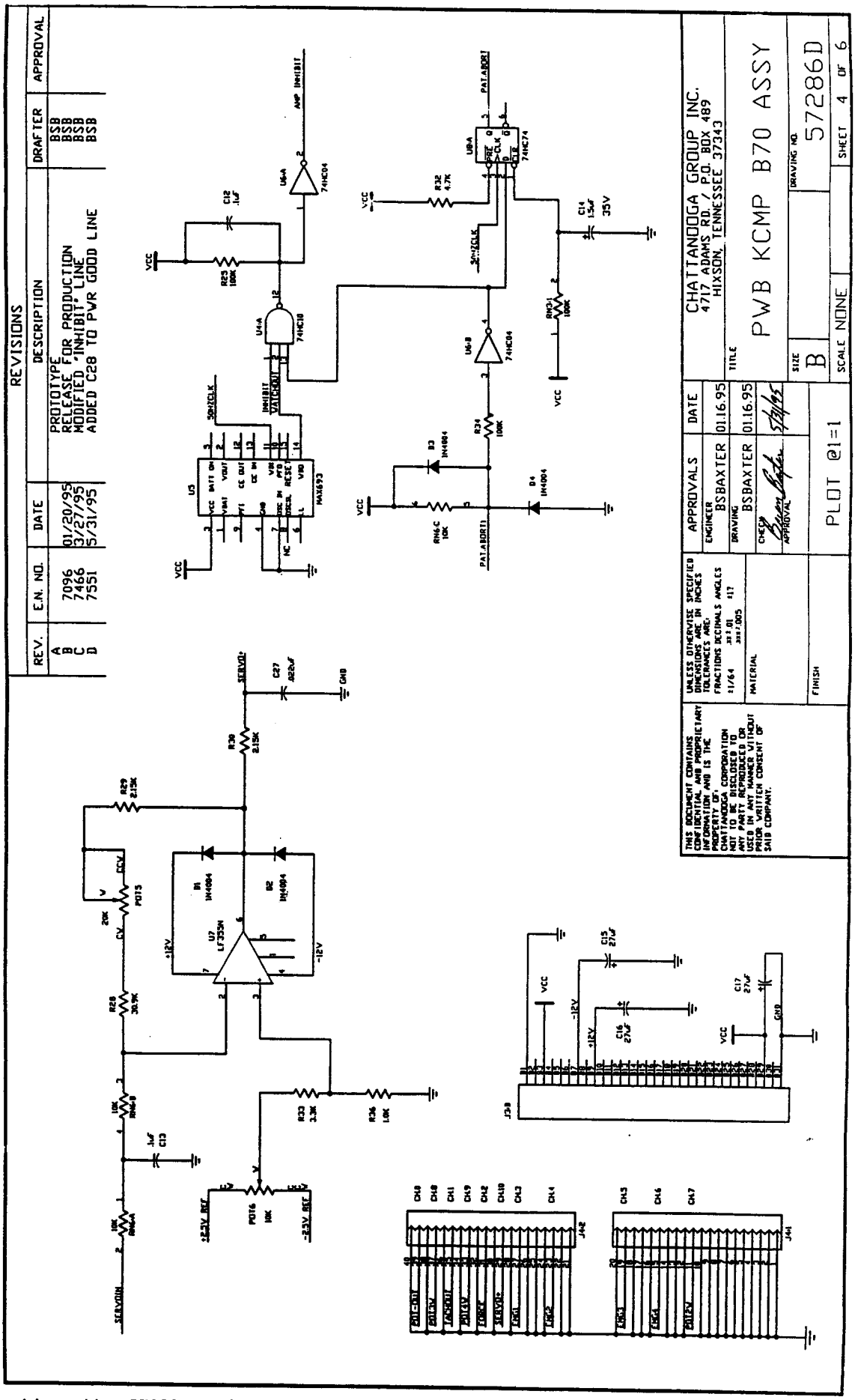
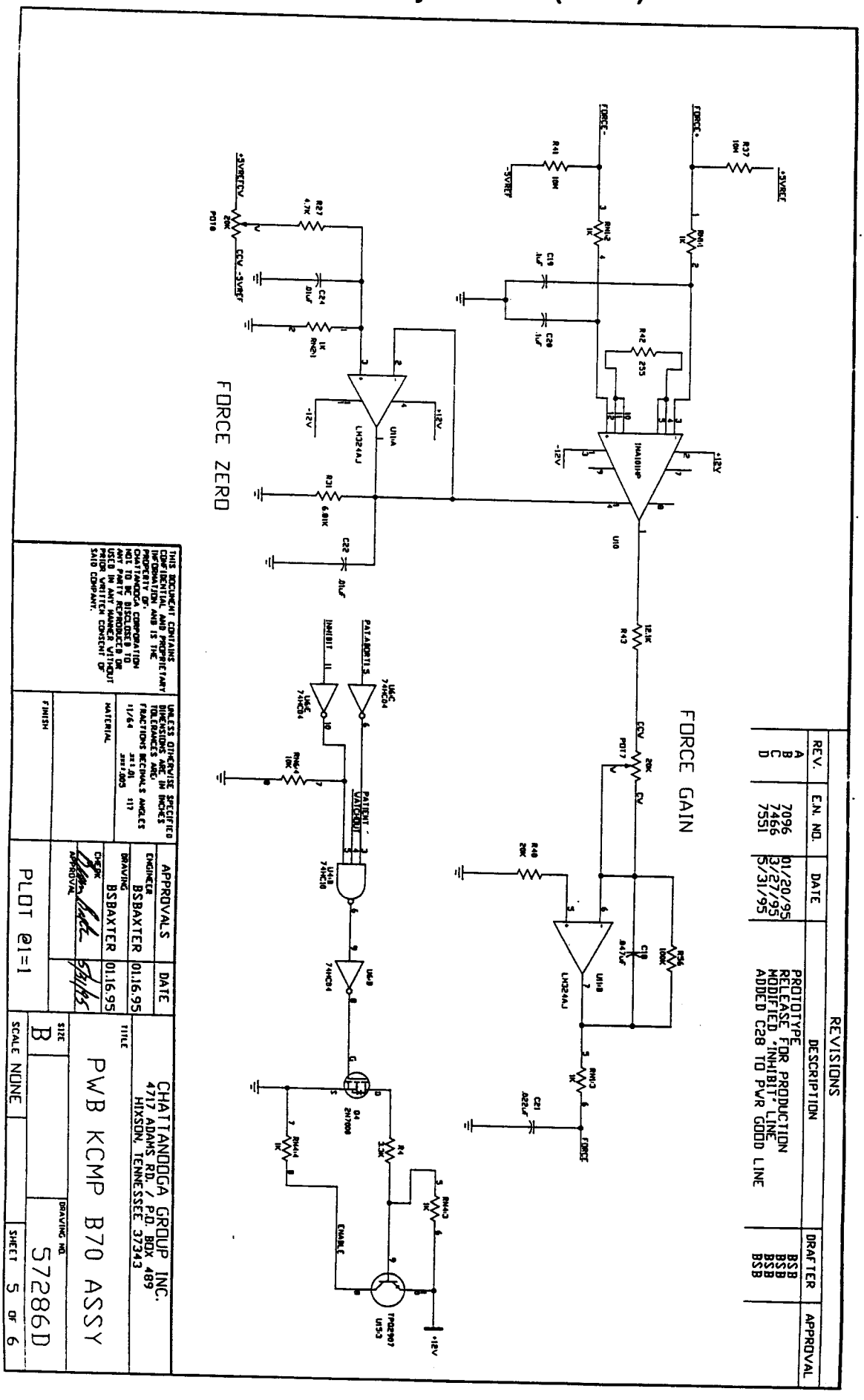
POT-OUT
C11 .047uF
R18 1.0K
CV
CCV
POT3
R14 174K
U1:B LF347N
R22 100K
R24 215K
RN5-4 10K
+2.5V REF
-2.5V REF
POT4
R17 120K
C9 .1uF
R16 475
U1:A LF347N
+12V
-12V
C10 .1uF
R21 10K
10M
U3 AD707J
R13 5.62K
R20 5.62K
U2 REF02
C8 .1uF

MP B70 Power Board Assembly – 57286 (3 of 6)

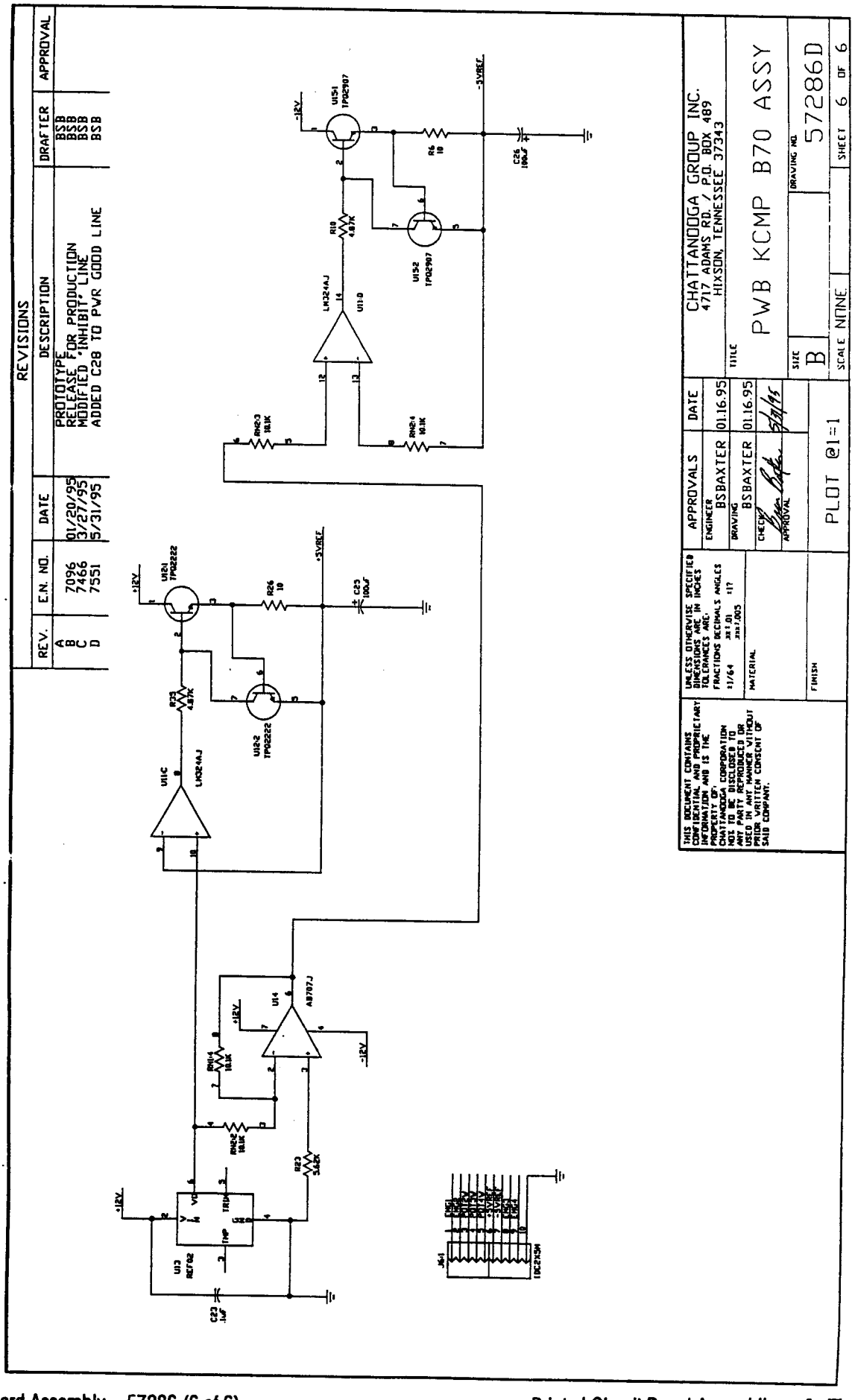


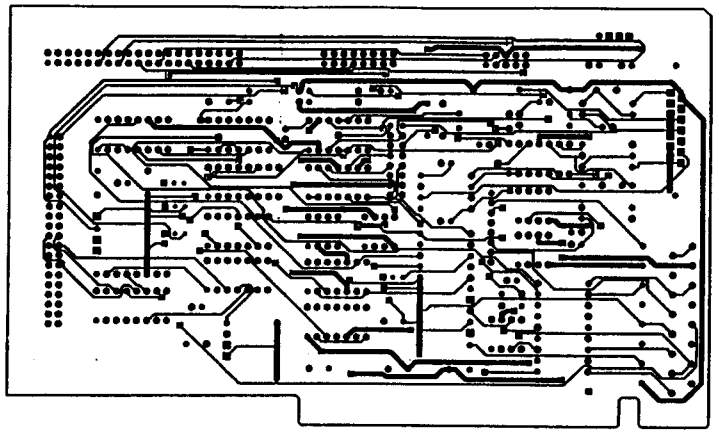

REVISIONS
REV. E.N. NO. DATE DESCRIPTION DRAFTER APPROVAL
A 7096 01/20/95 PROTOTYPE BSB
B 7466 3/27/95 RELEASE FOR PRODUCTION BSB
C 7551 5/31/95 MODIFIED "INHIBIT" LINE BSB
D ADDED C28 TO PWR GOOD LINE BSB
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
PWB KCMP B70 ASSY
SIZE B
DRAWING NO. 57286D
SCALE NONE
SHEET 4 OF 6
APPROVALS DATE
ENGINEER BSBAXTER 01.16.95
DRAWING BSBAXTER 01.16.95
CHECK
APPROVAL
PLOT @1=1
FINISH
MATERIAL
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 ±.01 ±1°
THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION AND IS THE PROPERTY OF CHATTANOOGA CORPORATION NOT TO BE DISCLOSED TO ANY PARTY REPRODUCED OR USED IN ANY MANNER WITHOUT PRIOR WRITTEN CONSENT OF SAID COMPANY.
U5 MAX693
U4A 74HC10
U4B 74HC04
U6A 74HC04
U8A 74HC74
U7 LF353N
D1 IN4004
D2 IN4004
D3 IN4004
D4 IN4004
J38
J42
J41
VCC
GND
-12V
+12V
+5V REF
-5V REF
SERVO IN
SERVO OUT
PAT-ABORT
INHIBIT
AMP INHIBIT

MP B70 Power Board Assembly – 57286 (5 of 6)

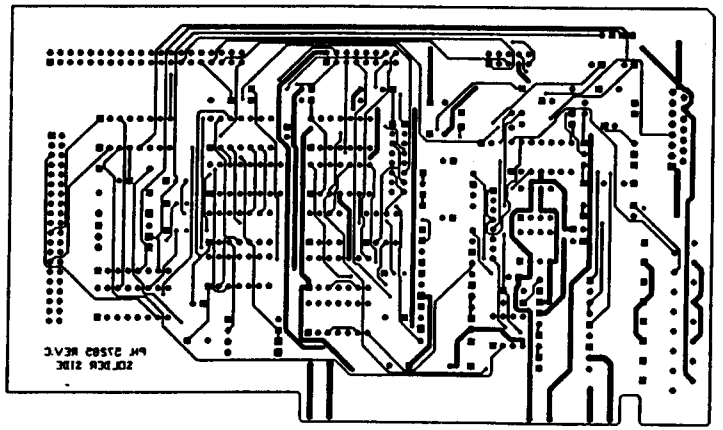


MP B70 Power Board Assembly – 57286 (6 of 6)





TOP



BOTTOM

REVISIONS					
REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A			PROTOTYPE	BSB	
B	7096	01/20/95	RELEASE FOR PRODUCTION	BSB	F.B.
C	7480	04/3/95	REROUTED INHIBIT AND AMP DRIVE	BSB	

1.) MATERIAL: LAMINATED SHEET COPPERCLAD TYPE FR-4
2.) CONDUCTIVE LAYERS TO BE 1.5 OZ. MIN
3.) TOTAL BOARD THICKNESS IS .062"
4.) REMOVE ALL BURRS AND SHARP EDGES
5.) FINISH: SOLDER COAT 63% TIN, 37% LEAD, .0003" MIN.
6.) NICKS OR CUT CONDUCTORS MORE THAN 10% OF CONDUCTOR WIDTH SHALL NOT BE ACCEPTABLE
7.) ALL HOLES TO BE DRILLED +/- .003 TO SPECIFIED DIA.
8.) ETCHED ALPHA-NUMERICAL CHARACTERS TO BE LEGIBLE
9.) SILKSCREEN ON COMPONENT SIDE USING WHITE OR YELLOW NON-CONDUCTIVE INK, REGISTRATION MUST BE WITHIN .010".
10.) VENDOR MARKING ACCEPTABLE ON SOLDER SIDE ONLY, ETCHED
11.) SOLDERMASK ON BOTH SIDES WITH EPOXY OR DRY FILM
12.) BOARD IS FOUR LAYER, PWR AND GND ARE NOT SHOWN
13.) BOARD MUST BE UL RECOGNIZED WITH A MINIMUM FLAME RATING OF 94V-2

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 .XX ±.01 .XXX ±.005

MATERIAL

FINISH

APPROVALS	DATE
ENGINEER BSBAXTER	01.16.95
DRAWING BSBAXTER	01.16.95
CHECK	4/4/95
APPROVAL	4/4/95

PLOT @1=1

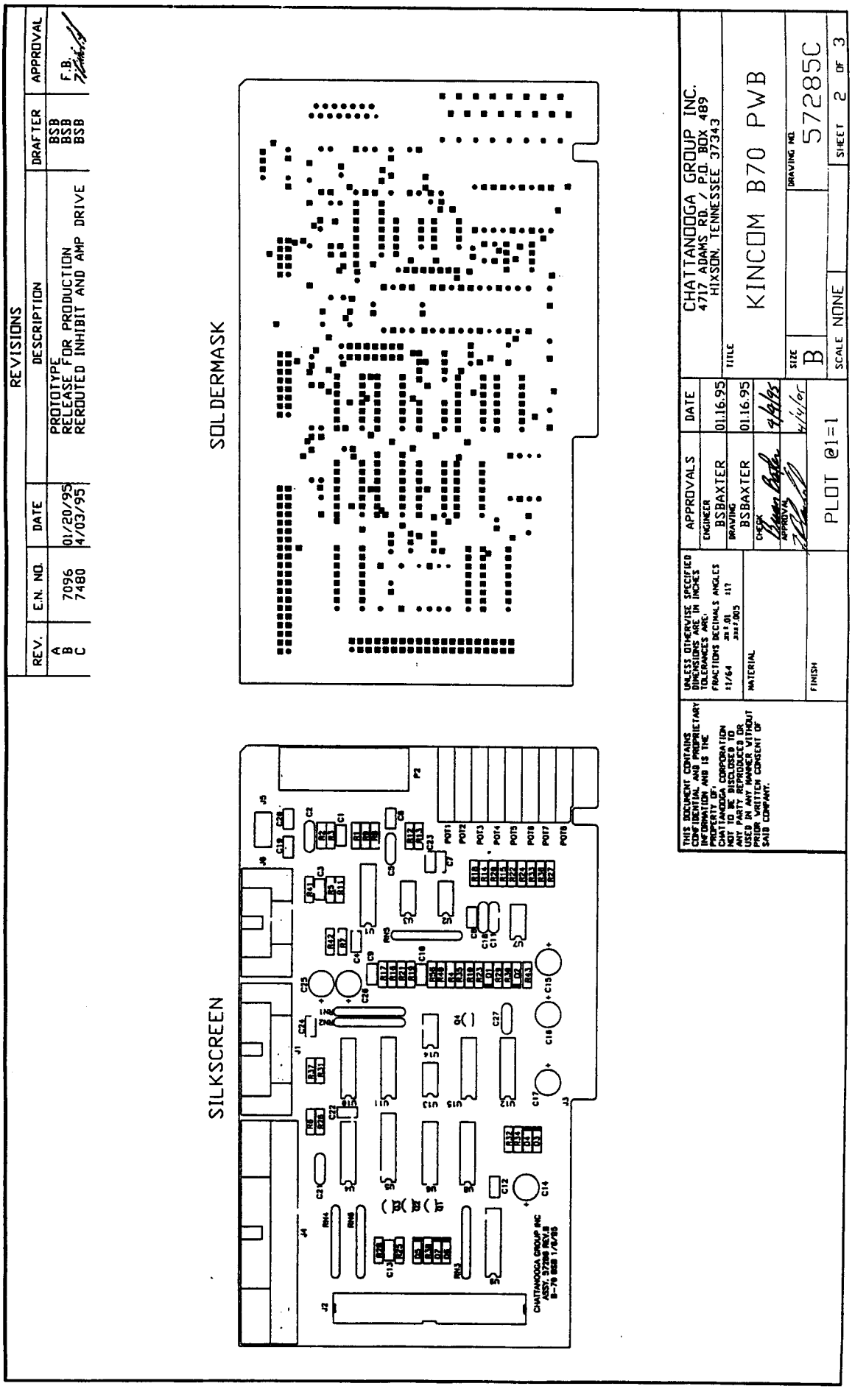
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343

TITLE: KINCOM B70 PWB

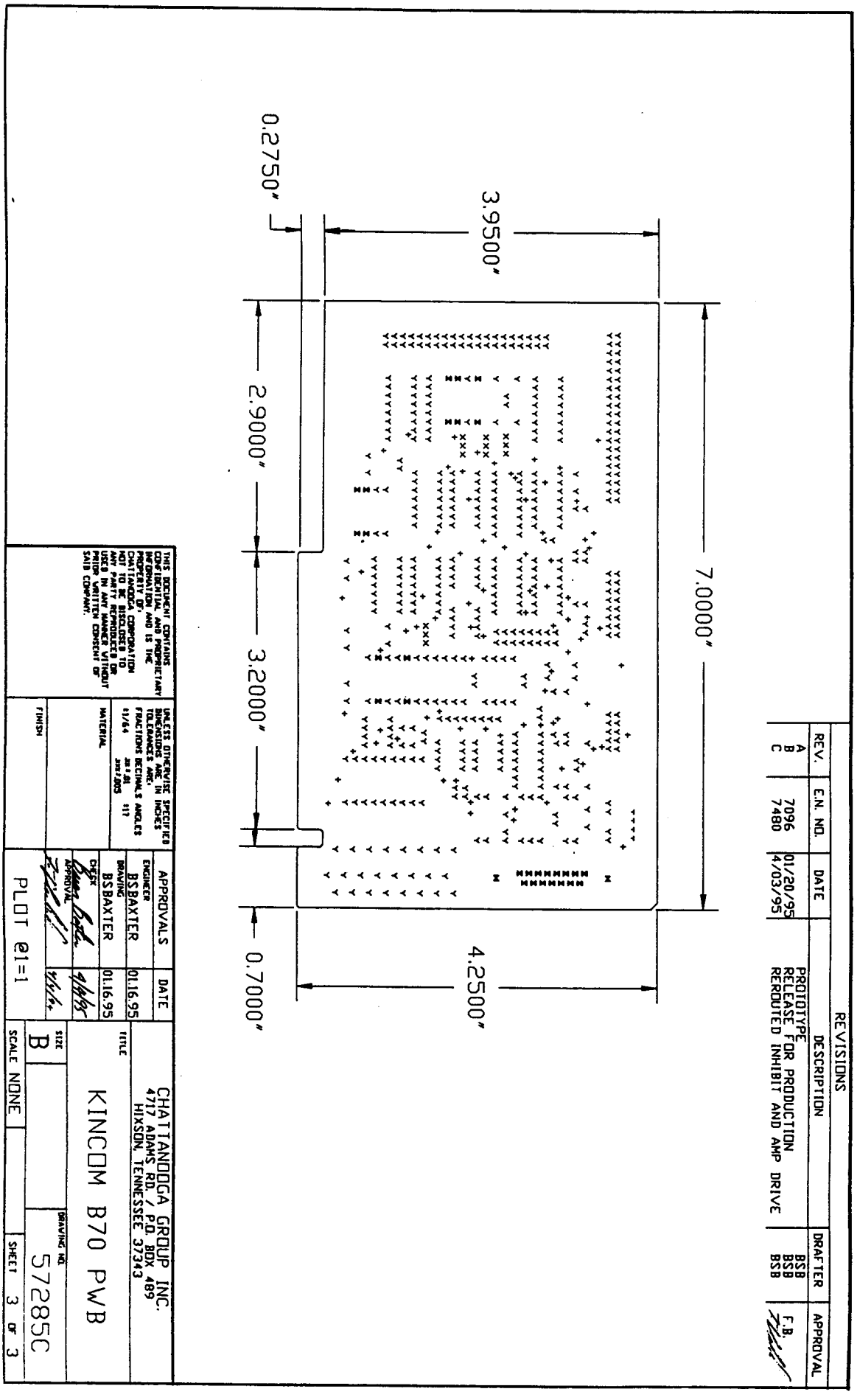
SIZE: B | DRAWING NO: 57285C

SCALE: NONE | SHEET 1 OF 3

B70 Power Board – 57285 (2 of 3)



B70 Power Board – 57285 (3 of 3)



REVISIONS				
REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01/20/95	PROTOTYPE	BSB	F.B.
B	7480	4/03/95	RELEASE FOR PRODUCTION	BSB	
C			REROUTED INHIBIT AND AMP DRIVE	BSB	

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 .xx ±.01 .xxx ±.005 ±1°

MATERIAL

FINISH

APPROVALS		DATE
ENGINEER	BSBAXTER	01.16.95
DRAWING	BSBAXTER	01.16.95
CHECK APPROVAL		

PLOT @1=1

CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343

TITLE
KINCOM B70 PWB

SIZE B

DRAWING NO. 57285C

SCALE NONE

SHEET 3 OF 3

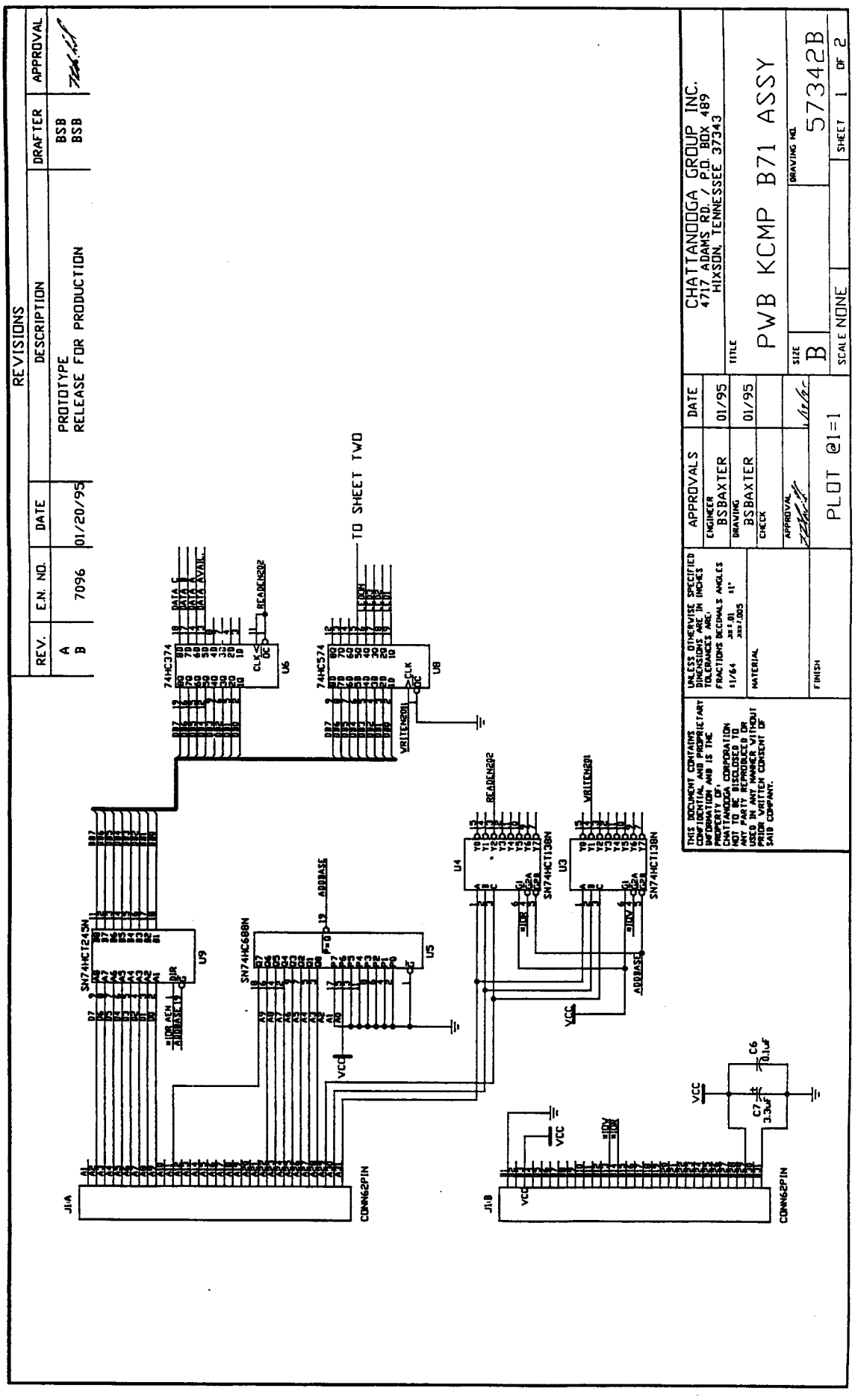
Bill of Materials for 57286 (1 of 2)

QNTY	TYPE	VALUE	REF DESIGNATORS	PART No.	MANUFACTURER
4	2N7000	MOSFET	Q1,Q2,Q3,Q4	71916	Siliconix (TO-92)
1	74HC04	INVERTER	U6	53176	T.I. or equivalent
1	74HC10	NAND (3)	U4	53177	T.I. or equivalent
1	74HC74	Dflop	U8	53178	T.I. or equivalent
1	74LS367	BUFFER	U9	73093	T.I. or equivalent
2	AD707JN	OPAMP	U3,U14	53005	Analog Devices
5	CAP	.01uF	C1,C6,C7,C22,C24	70256	5020EM50RD103M (X7R) 50V
4	CAP	.022uF	C2,C5,C21,C27	70045	100V MYLAR METAL FILM
2	CAP	.047uF	C11,C18	72995	MONO CERAMIC 50 V
10	CAP	.1uF	C3,C4,C8,C9,C10,C12,	72982	5020EM50RD104 (X7R) 50V
			C13,C19,C20,C23,C28		
2	DIODE (Z)	5.1V	D6,D7	72368	MOTOROLA IN5233
1	DB15RM	CONN	P2	73355	POSITRONICS MD15M560TZ
5	DIODE	IN4004	D1,D2,D3,D4,D5	70028	ANY
1	IDC2X8M	16PIN	J1	75616	3M 3408-1302
1	IDC2X5M	10PIN	J6	54794	3M 3446-1302
1	IDC2X20M	40PIN	J4	73080	3M 3432-1302
1	INA101HP	AMPL	U10	73023	BURR-BROWN
1	LR347N	AMPL	U1	70258	MOTOROLA, NATIONAL
1	LF355N	AMPL	U7	70219	NATIONAL
1	LM324AJ	AMPL	U11	70166	TEXAS INSTRUMENTS
1	MAX693	SUPRV	U5	75625	MAXIM
1	POLCAP	1.5uF	C14	71738	35V, RADIAL TANTALUM
3	POLCAP	27uF	C15,C16,C17	70265	35V, RADIAL TANTALUM
2	POLCAP	100uF	C25,C26	73001	SPRAGUE, RADIAL
1	HEADER	40PIN	J2	75113	3M 2440-6122
4	POT	10K	POT2,POT3,POT4,POT6	74729	BOURNS 3006 103
4	POT	20K	POT1,POT5,POT7,POT8	75112	BOURNS 3006 203
1	CONN	4PINRA	J5		MOLEX 22-12-2044
2	REF02	5VREF	U2,U13	53006	AN. DEV ONLY ADREF02HQ
4	RES	1K	R7,R18,R19,R36	70140	1/4W, 1%, MF
1	RES	1.69K	R13	73088	1/4W, 1%, MF
3	RES	2.15K	R24,R29,R30	74733	1/4W, 1%, MF
3	RES	10M	R21,R37,R41	70653	1/4W, 5%, CC OR CF
2	RES	3,3K	R4,R33	70015	1/4W, 5%, CC OR CF
2	RES	4.7K	R27,R32	70585	1/4W, 5%, CC OR CF
2	RES	4.87K	R10,R35	70098	1/4W, 1%, MF
7	RES	4.99K	R1,R2,R3,R8,R9,R11,R38	70064	1/4W, 1%, MF
3	RES	5.62K	R15,R20,R23	53022	1/4W, 1%, MF
1	RES	6.81K	R31	74623	1/4W, 1%, MF

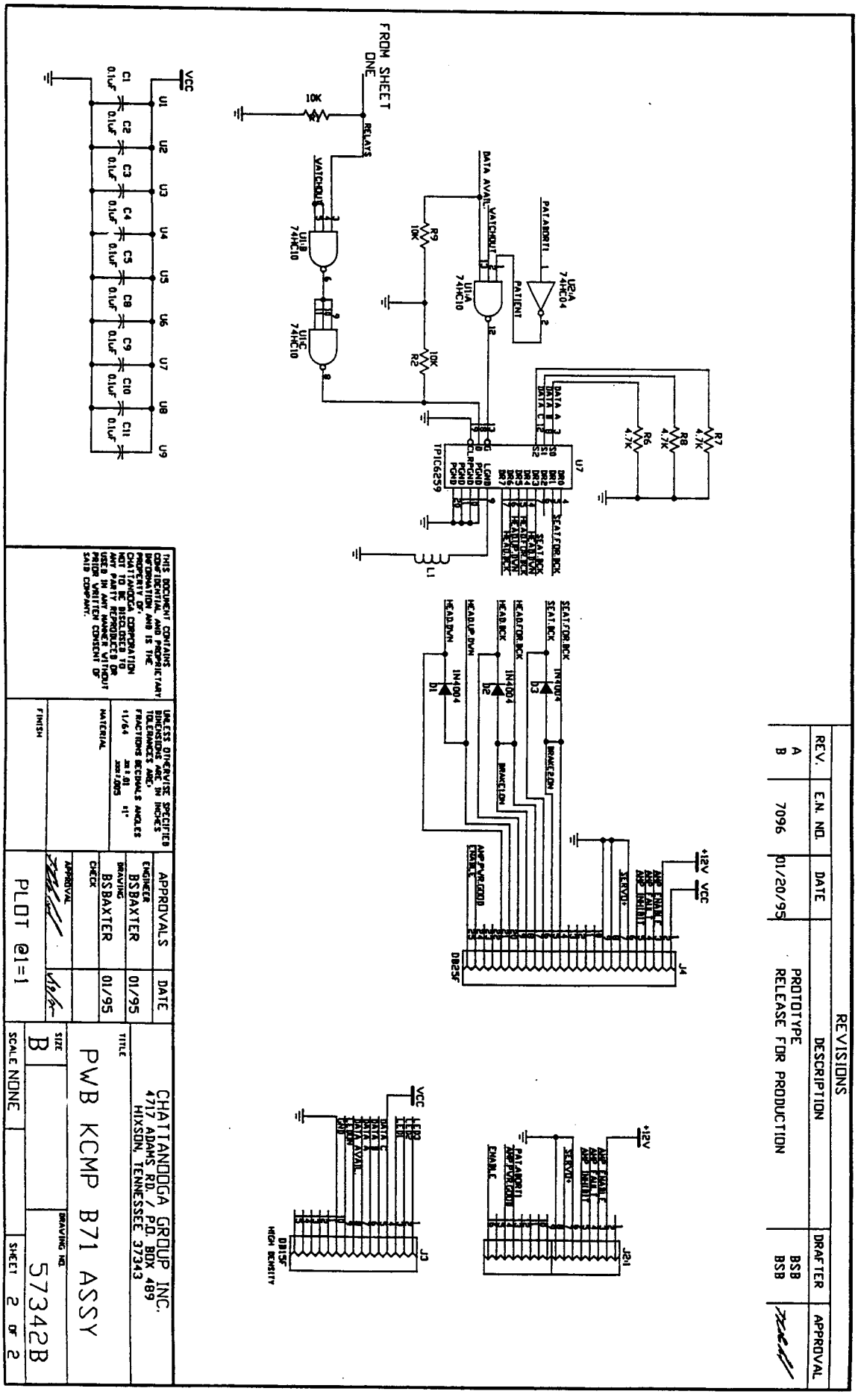
Bill of Materials for 57286 (2 of 2)

QNTY	TYPE	VALUE	REF DESIGNATORS	PART No.	MANUFACTURER
1	RES	12.1K	R43	72963	1/4W, 1% MF
2	RES	20K	R5,R40	71944	1/4W, 1% MF
2	RES	10	R6,R26	75996	1/4W, 1% MF
1	RES	30.9K	R28	70695	1/4W, 1% MF
5	RES	100K	R12,R22,R25,R34,R56	71875	1/4W, 1% MF
1	RES	120K	R17	70100	1/4W, 1% MF
1	RES	174K	R14	73087	1/4W, 1% MF
1	RES	255	R42	53018	1/4W, 1% MF; RN55
1	RES	475	R16	71848	1/4W, 1% MF
3	RES NET	1K	RN1,RN2,RN4	71354	AB708B102
2	RES NET	10K	RN5,RN6	71355	AB708B103
1	RES NET	100K	RN3	71356	AB708B104
1	TPQ2222		U12	53991	MOTOROLA, DIP, QUAD
1	TPQ2907		U15	53992	MOTOROLA, DIP,QUAD
5	SOCKET	8PIN		70061	TI C8408-02 LO-PRO
2	SOCKET	16PIN		70042	TI C8416-02 LO-PRO
8	SOCKET	14PIN		70041	TI C8414-02 LO-PRO
1	BRACKET	25/15		57517	XTR 2515-A OLSEN METALS
1	PCB			57285	.062" MULTILAYER PLATED THROUGH FR-4, SOLDERMASK BOTH SIDES, YELLOW OR WHITE SILKSCREEN, 2 OZ. CU FINAL THICKNESS, EPOXY OR DRY FILM SOLDER MASK, INHOUSE MANUF. STANDARDS, LAYER STACKING: TOP, GND, VCC, BOT

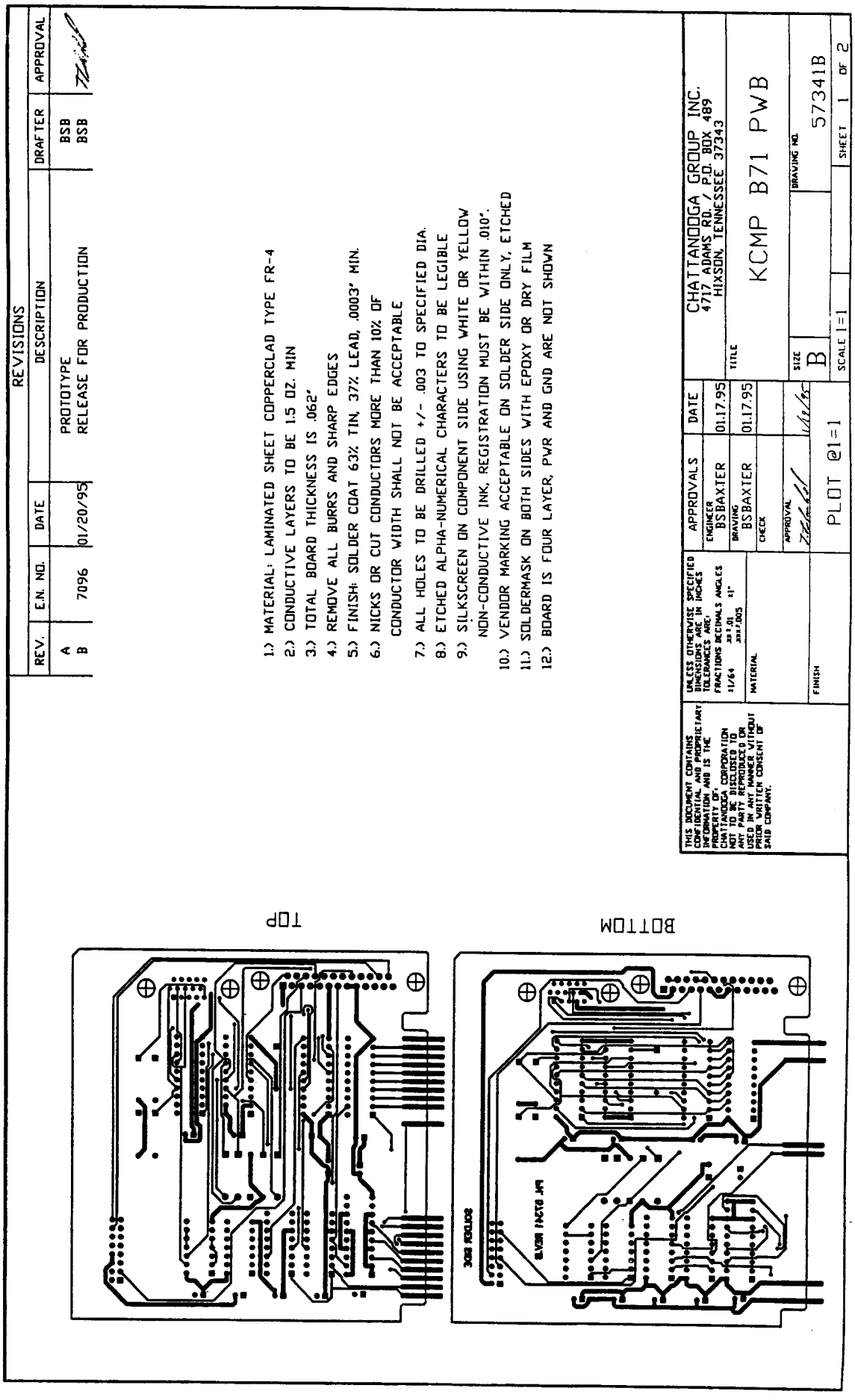
MP B71 Power Board Assembly – 57342 (1 of 2)



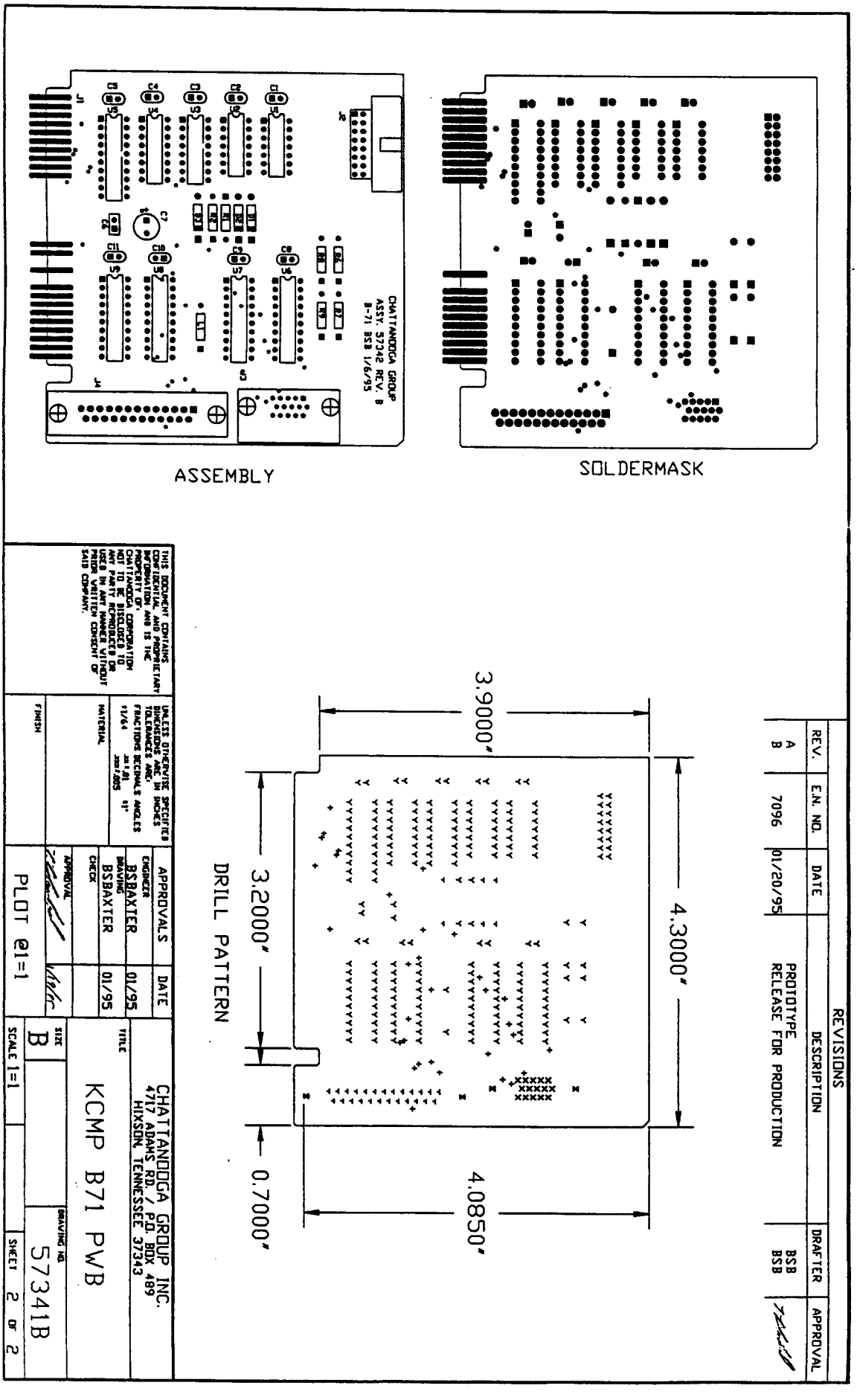
MP B71 Power Board Assembly – 57342 (2 of 2)



MP B71 Power Board – 57341 (1 of 2)



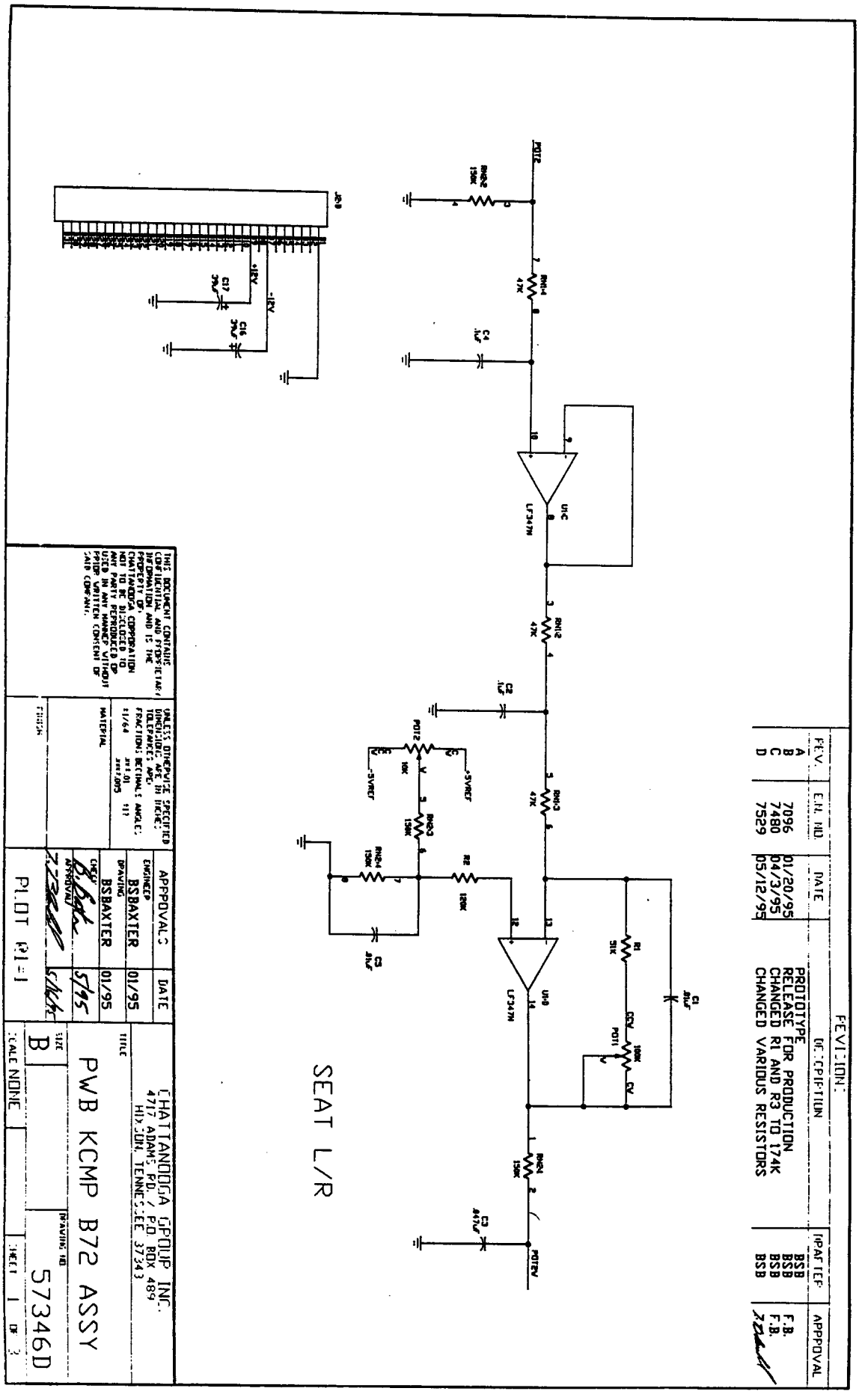
MP B71 Power Board – 57341 (2 of 2)



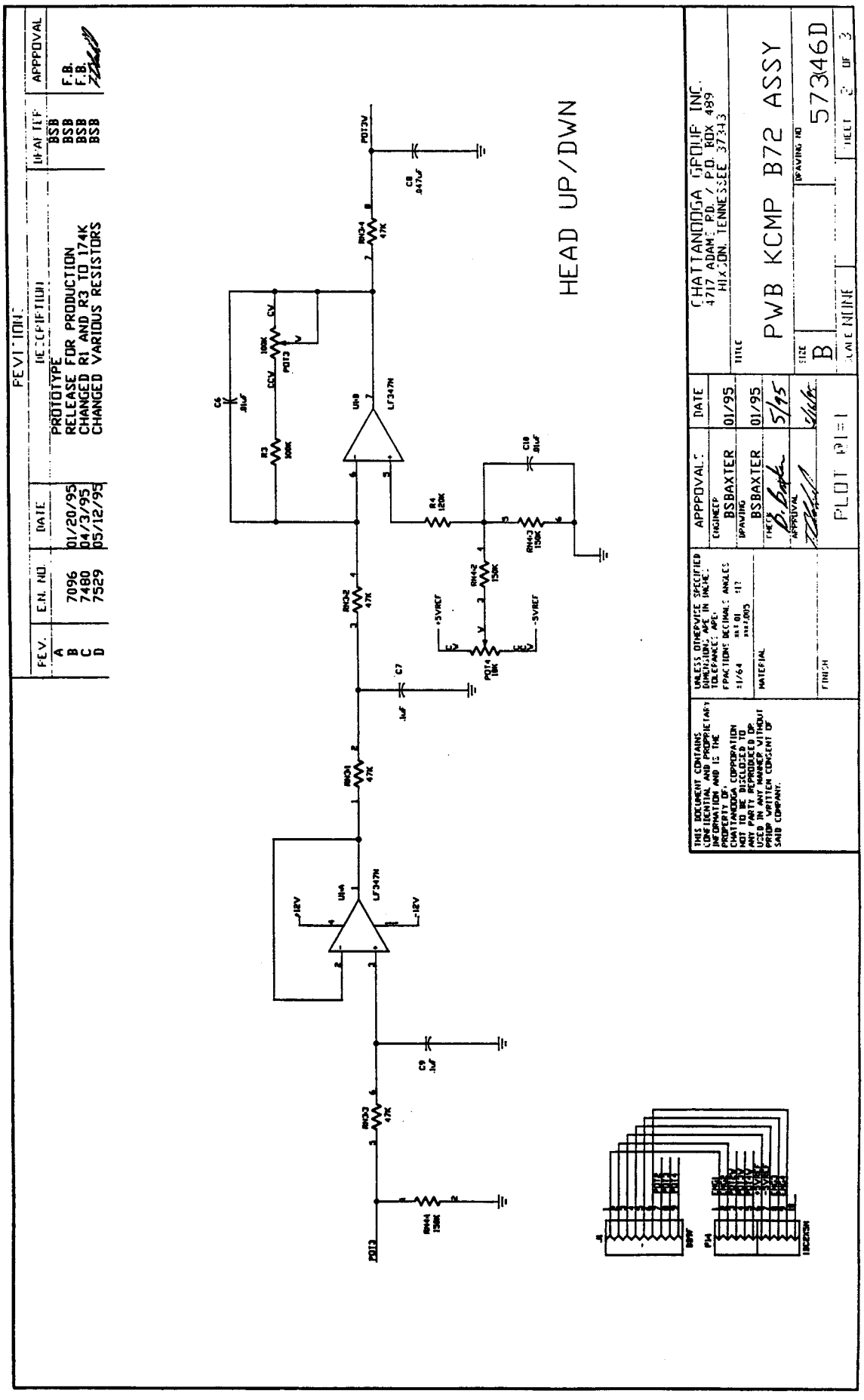
B71 Bill of Materials for 57342

QNTY	TYPE	VALUE	REF DESIGNATORS	PART No.	MANUFACTURER
1	74HC374	BUFFER	U6	52859	T.I. or equivalent
1	74HC04	INVERTER	U2	53176	T.I. or equivalent
1	74HC10	NAND (3)	U1	53177	T.I. or equivalent
1	74HC574	BUFFER	U8	54480	T.I. or equivalent
10	CAP	.1 uF	C1,C2,C3,C4,C5,C6,C8,C9,	72982	5020EM50RD104 (X7R) 50V
			C10,C11		
1	DB15HDRF	CONN	J3	57490	AMP 748390-5
1	DB25RF	CONN	J4	73077	AMP 747846-4
2	STANDOFF	4-40	NONE (J3 & J4)	70685	AMP 200719-1
3	DIODE	IN4004	D1,D2,D3	70028	ANY
1	IDC2X8M	16PIN	J2	75616	3M 3446-1302
1	INDUCTOR		L1	53784	STEWARD 28L0138-800
1	POLCAP	3.3uF	C7	70260	35V, RADIAL TANTALUM
3	RESISTOR	10K	R1,R2,R9	71863	1/4W, 1%, MF
1	74HC688N	COMP	U5	52862	T.I. or equivalent
2	74HCT138N	MUX	U3,U4	52860	T.I. or equivalent
1	74HCT245N	TRANS	U9	52861	T.I. or equivalent
1	TPIC6259	DRIVER	U7	54477	T.I.
5	SOCKET	20PIN		72883	AMP 640463-3 20 PIN
2	SOCKET	16PIN		70042	TI C8416-02 LO-PRO
2	SOCKET	14PIN		70041	TI C8414-02 LO-PRO
1	BRACKET	25/09		55193	XTR 2509-A OLSEN METALS
1	PCB			57341	.062" PLATED THROUGH FR-4 SOLDERMASK BOTH SIDES, YELLOW OR WHITE SILKSCREEN 2 OZ. CU FINAL THICKNESS, EPOXY OR DRY FILM SOLDER MASK, INHOUSE MANUFACTURER STANDARDS
3	RESISTOR	4.7K	R6,R7,R8	70585	1/4 W, 5%, CC OR CF

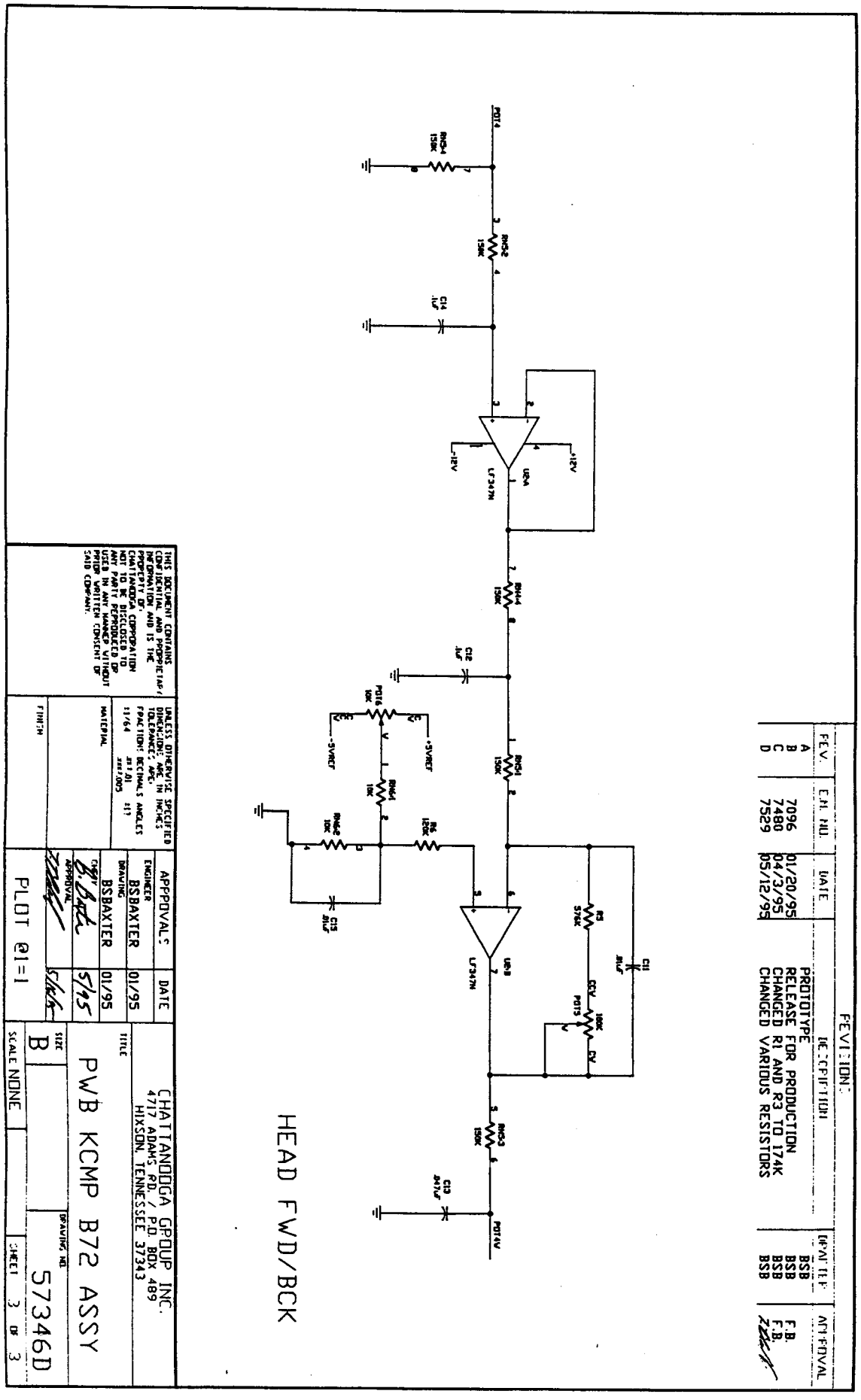
MP B72 Power Board Assembly – 57346 (1 of 3)

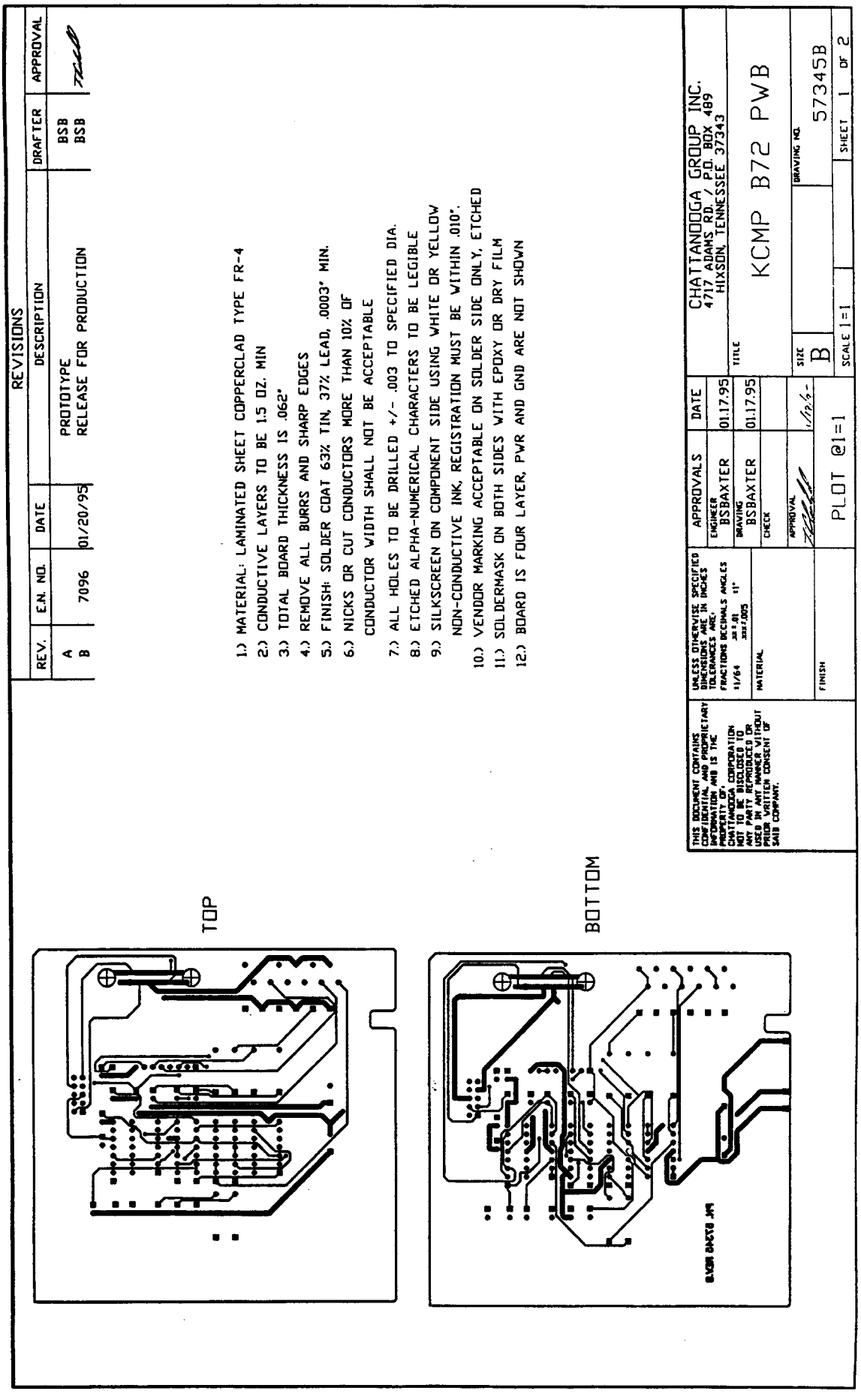


MP B72 Power Board Assembly – 57346 (2 of 3)



MP B72 Power Board Assembly – 57346 (3 of 3)




REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | PROTOTYPE | BSB
B | | | RELEASE FOR PRODUCTION | BSB
1.) MATERIAL: LAMINATED SHEET COPPERCLAD TYPE FR-4
2.) CONDUCTIVE LAYERS TO BE 1.5 OZ. MIN
3.) TOTAL BOARD THICKNESS IS .062"
4.) REMOVE ALL BURRS AND SHARP EDGES
5.) FINISH: SOLDER COAT 63% TIN, 37% LEAD, .0003" MIN.
6.) NICKS OR CUT CONDUCTORS MORE THAN 10% OF CONDUCTOR WIDTH SHALL NOT BE ACCEPTABLE
7.) ALL HOLES TO BE DRILLED +/- .003 TO SPECIFIED DIA.
8.) ETCHED ALPHA-NUMERICAL CHARACTERS TO BE LEGIBLE
9.) SILKSCREEN ON COMPONENT SIDE USING WHITE OR YELLOW NON-CONDUCTIVE INK, REGISTRATION MUST BE WITHIN .010".
10.) VENDOR MARKING ACCEPTABLE ON SOLDER SIDE ONLY, ETCHED
11.) SOLDERMASK ON BOTH SIDES WITH EPOXY OR DRY FILM
12.) BOARD IS FOUR LAYER, PWR AND GND ARE NOT SHOWN
TOP
BOTTOM
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
APPROVALS
ENGINEER BSBAXTER 01.17.95
DRAWING BSBAXTER 01.17.95
CHECK
APPROVAL
DATE
TITLE
KCMP B72 PWB
SIZE B
DRAWING NO. 57345B
SCALE 1=1
SHEET 1 OF 2
PLOT @1=1
FINISH
MATERIAL
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES 11/64 .XX ±.01 .XXX ±.005 ±1°
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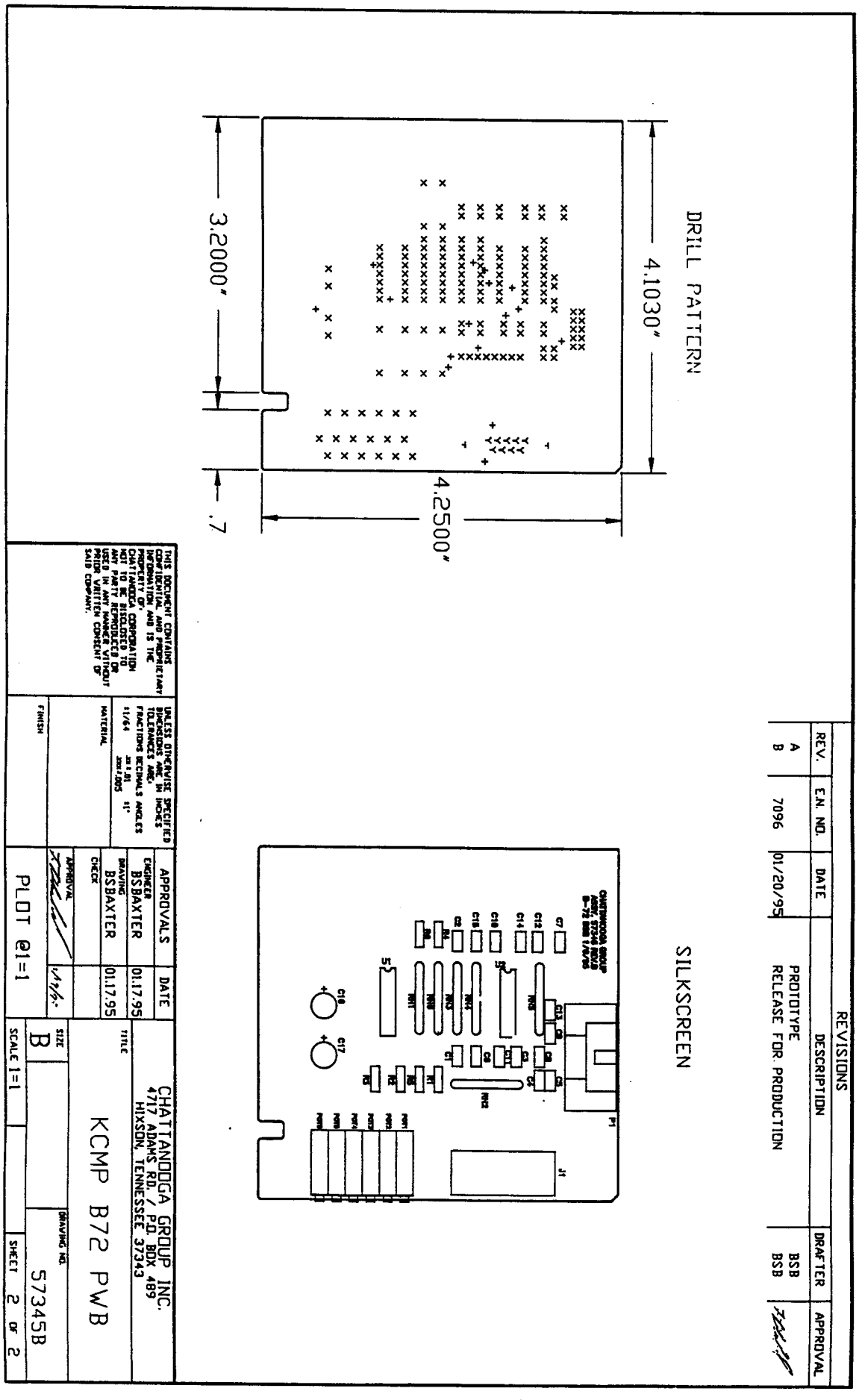
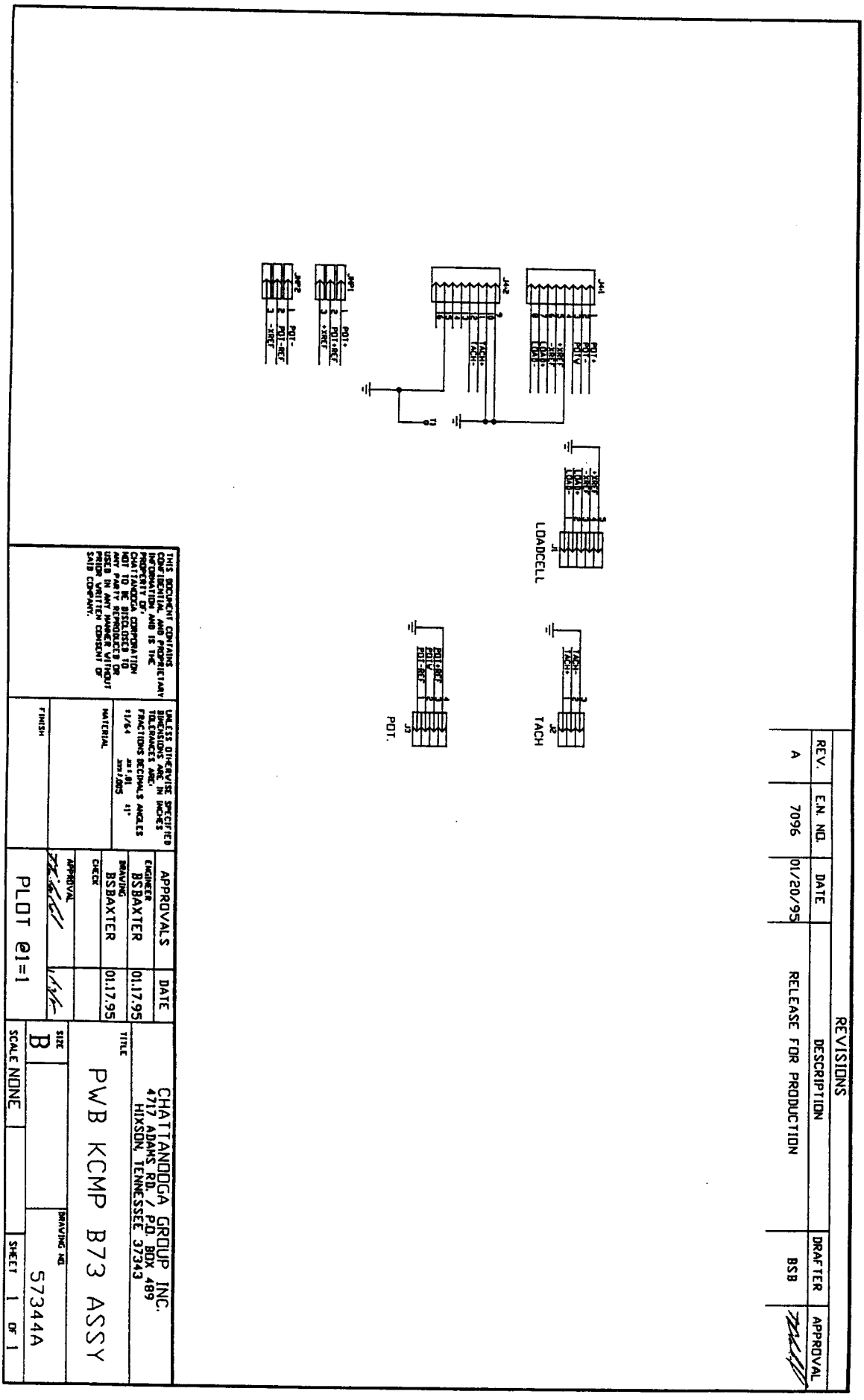


MP B72 Power Board – 57345 (2 of 2)

B72 Bill of Materials for 57346

QNTY	TYPE	VALUE	REF DESIGNATORS	PART No.	MANUFACTURER
6	CAP	.01uF	C1,C10,C11,C15,C5,C6	70256	5020EM50RD103M (X7R) 50V
6	CAP	.1uF	C12,C14,C2,C4,C7,C9	72982	5020EM50RD104M (X7R)50V
3	CAP	.047uF	C13,C3,C8	72995	MONO CERAMIC 50V
1	DB9RF	CONN	J1	75197	AMP 747844-4 or equivalent
1	IDC2X5M	CONN	P1	54794	3M 3446-1302
2	LF347	OPAMP	U1,U2	70258	MOTOROLA
2	POLCAP	39uF	C16,C17	72353	35V, RADIAL TANTALUM
3	TRMPOT	100K	POT1,POT3,POT5	75111	BOURNS 3006P 104
3	TRMPOT	10K	POT2,POT4,POT6	75110	BOURNS 3006P 103
3	RES	120K	R2,R4,R6	70613	1/4W, 5%, CF OR CC
2	RES	51K	R1	73332	1/4W, 1%, MF
2	RESISTNET	47K	RN1,RN3	54835	DALE MSP08A-3
1	RES	100K	R3	71875	1/4W, 1%, MF
2	RESISTNET	150K	RN4,RN5	54831	DALE MSP08A-3
1	RESISTNET	10K	RN6	54836	DALE MSP08A-3
2	SOCKET	14PIN		70041	TI C8414-02 LO-PRO
1	BRACKET	25/09		55193	XTR 2509-A OLSEN METALS
1	PCB			57345	.062" PLATED THROUGH FR-4 SOLDERMASK BOTH SIDES, YELLOW OR WHITE SILKSCREEN 2 OZ. CU FINAL THICKNESS, EPOXY OR DRY FILM SOLDER MASK, INHOUSE MANUFACTURER STANDARDS
1	RES	576K	R5	76757	1/W, 5%, CF OR CC


REVISIONS
REV.
E.N. NO.
DATE
DESCRIPTION
DRAFTER
APPROVAL
A
7096
01/20/95
RELEASE FOR PRODUCTION
BSB
LOADCELL
TACH
POT.
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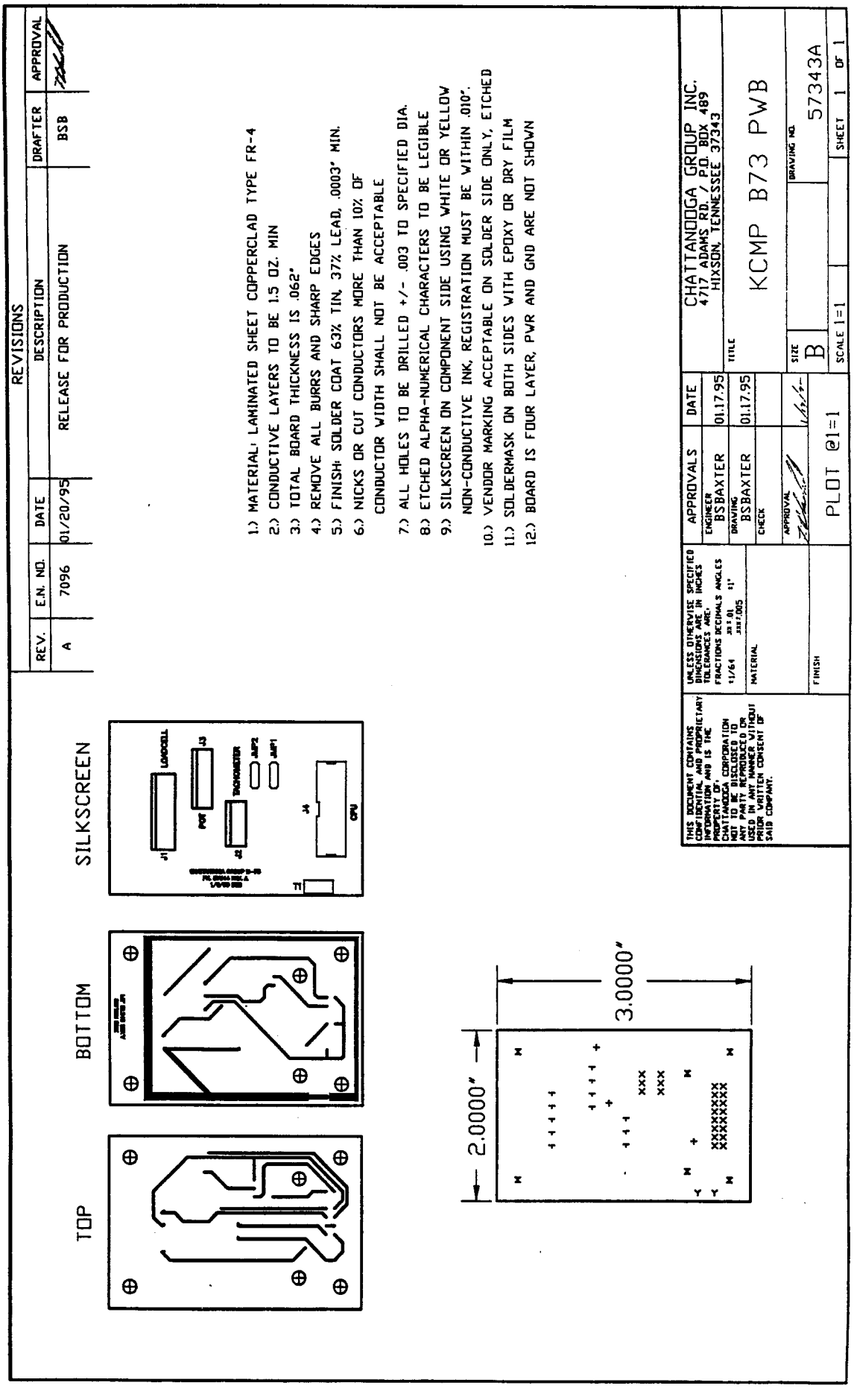
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES
APPROVALS
DATE
ENGINEER BSBAXTER 01.17.95
DRAWING BSBAXTER 01.17.95
CHECK
APPROVAL
FINISH
MATERIAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
PWB KCMP B73 ASSY
SIZE
B
DRAWING NO.
57344A
SCALE NONE
SHEET 1 OF 1


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | RELEASE FOR PRODUCTION | BSB
1.) MATERIAL: LAMINATED SHEET COPPERCLAD TYPE FR-4
2.) CONDUCTIVE LAYERS TO BE 1.5 OZ. MIN
3.) TOTAL BOARD THICKNESS IS .062"
4.) REMOVE ALL BURRS AND SHARP EDGES
5.) FINISH: SOLDER COAT 63% TIN, 37% LEAD, .0003" MIN.
6.) NICKS OR CUT CONDUCTORS MORE THAN 10% OF CONDUCTOR WIDTH SHALL NOT BE ACCEPTABLE
7.) ALL HOLES TO BE DRILLED +/- .003 TO SPECIFIED DIA.
8.) ETCHED ALPHA-NUMERICAL CHARACTERS TO BE LEGIBLE
9.) SILKSCREEN ON COMPONENT SIDE USING WHITE OR YELLOW NON-CONDUCTIVE INK, REGISTRATION MUST BE WITHIN .010".
10.) VENDOR MARKING ACCEPTABLE ON SOLDER SIDE ONLY, ETCHED
11.) SOLDERMASK ON BOTH SIDES WITH EPOXY OR DRY FILM
12.) BOARD IS FOUR LAYER, PWR AND GND ARE NOT SHOWN
SILKSCREEN
BOTTOM
TOP
2.0000"
3.0000"
THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION AND IS THE PROPERTY OF CHATTANOOGA CORPORATION AND MAY NOT BE DISCLOSED TO ANY PARTY, REPRODUCED OR USED IN ANY MANNER WITHOUT PRIOR WRITTEN CONSENT OF SAID COMPANY.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES
MATERIAL
FINISH
APPROVALS | DATE
ENGINEER BSBAXTER 01.17.95
DRAWING BSBAXTER 01.17.95
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
KCMP B73 PWB
SIZE B
DRAWING NO. 57343A
SCALE 1=1
SHEET 1 OF 1

B73 Bill of Materials for 57344

QNTY	TYPE	VALUE	REF DESIGNATORS	PART No.	MANUFACTURER
1	CONN .156	3PIN	J2	54659	AMP 641209-3 (GOLD)
1	CONN .156	4PIN	J3	75148	AMP 641209-4 (GOLD)
1	CONN .156	5PIN	J1	54660	AMP 641209-5 (GOLD)
2	HEADER	3PIN	JMP1,JMP2	73207	MOLEX 22-10-2031 (GOLD)
1	IDC2X8M	CONN	J4	75616	3M 3408-1302
1	TERMINAL	R. ANGLE	T1	54793	ZIERICK 957
1	PCB			57343	.062" PLATED THROUGH FR-4 SOLDERMASK BOTH SIDES, YELLOW OR WHITE SILKSCREEN 2 OZ. CU FINAL THICKNESS, EPOXY OR DRY FILM SOLDER MASK, INHOUSE MANUFACTURER STANDARDS
2	.100 JMP	2PIN	JMP1,JMP2	71431	65474-004 (BERG)

SECTION

5

Computer Configurations

Compact Computer Jumper Settings

Ensure that the following jumper settings are made on the Compaq Prolinea:

2 = Pins 2 and 3 tied together
3 = Pins 2 and 3 tied together
4 = Pins 2 and 3 tied together
5 = Pins 2 and 3 tied together
6 = Pins 2 and 3 tied together
7 = Pins 2 and 3 tied together

Erratic operation will occur if these settings are not correct.

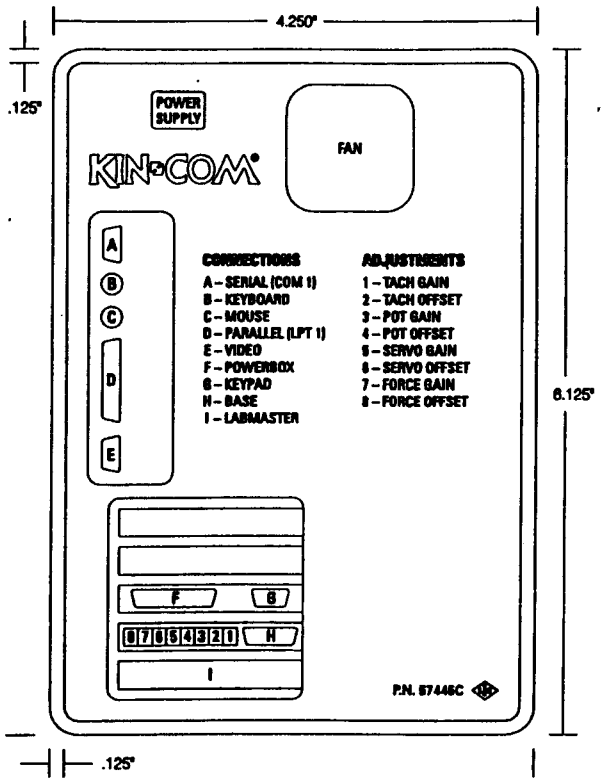
Chattanooga Group Computer Configuration

KIN-COM R-100 – 57401

PART No.	DESCRIPTION	LOCATION
57678	LABMASTER DMA A/D	SLOT-1
57286	PCB-70	SLOT-2
57561	PCB-70 HARNESS ASSY	SLOT-3
	VACANT	SLOT-4
	VACANT	SLOT-5
	LABMASTER DAUGHTER PCB	BAY-1
57673	COMPAQ COMPUTER PROLINEA SERIES	
57674	COMPAQ MOUNTING RAILS	

Miscellaneous Parts Kit

QNTY	PART No.	DESCRIPTION	NOTES
4	20029	Screw 4-40 x 3/8" Flt Hd Phil SS	
1	51486	Brkt KC500H Daughter Board SMC	
1	57503	Software Standard Computer	
4	71368	Standoff #6 x 3/4" 4538-632-B12	
1	55193	Brkt, XTR 2509-A	
1	57307	Harness KC MP B-70 B	
1	57306	Harness KC MP B-70 A	
1	57305	Harness A/D Converter	
1	57308	Harness KC MP B-70 Powerbox	Use 57561 as guide
1	57398	Harness KC MP B-70 Keypad	Use 57561 as guide
1	55924	Decal CPU Warning 120VAC	
4	60768	Nut 6-32 ESNA #22NM-62 Plated	
4	70628	Nut 4-40 ESNA	
4	71319	Screw 6-32 x 1/4" Truss Phil SST	
1	57445	Decal, KINCOM R-100 CPU	



REVISIONS					
REV.	EN. No.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01-20-95	Release for Production	BSB	
B	7397	02-15-95	Change Typestyle, Label Material and Adhesive	GLM	
C	7418	03-01-95	Change Connections for Compaq Computer	GLM	

NOTES

1. Material: MKS20 (2 mil)
2. Adhesive: UL Recognized Backing V-23
3. Black Ink Secoll Plas-Cal
4. Clear Laminated Fasson-Supercold Seal (1 mil)
5. All Lettering Vectored
6. All Corners to have .250" Radius
7. UL Recognized Marking and Labeling System
8. Tolerances: Fractions ±1/16, Decimals .XXX ±.015

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FRACT. ± 1/64 DEC. .xx ± .01 .xxx ± .006 ANGLES ± 1°

MATERIAL: MKS20 (2 mil) Adhesive V-23 Black Ink

FINISH

APPROVALS	DATE
ENGINEER BSBaxter	12-13-94
DRAWING G L Monks	02-15-95
CHECK	3-2-95
APPROVAL	3/2/95

CHATTANOOGA GROUP, INC.
4717 ADAMS ROAD
P.O. BOX 489
HIXSON, TN 37343-0489

TITLE: Decal KINCOM R-100 CPU

SIZE	SCALE	PLOT	SHEET	PART No.	REV
B	1 = 1	@1 = 1	1 of 1	57445	C

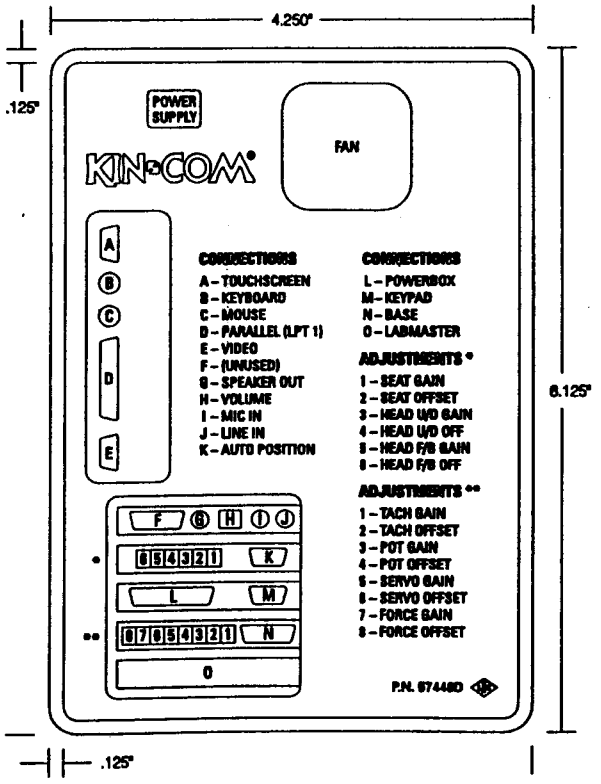
Chattanooga Group Computer Configuration

KIN-COM S-100 – 57458

PART No.	DESCRIPTION	LOCATION
57678	LABMASTER DMA A/D	SLOT-1
57286	PCB-70	SLOT-2
57342	PCB-71	SLOT-3
57346	PCB-72	SLOT-4
51727	SOUNDBLASTER PCB	SLOT-5
57677	350 MEG TAPE BACKUP	BAY-2
	LABMASTER DAUGHTER PCB	BAY-1
57673	COMPAQ COMPUTER	
57674	COMPAQ MOUNTING RAILS	

Miscellaneous Parts Kit

QNTY	PART No.	DESCRIPTION	NOTES
4	20029	Screw 4-40 x 3/8" Flt Hd Phil SS	
1	51486	Brkt KC500H Daughter Board SMC	
1	57504	Software Enhanced Computer	
1	57307	Harness KC MP B-70 B	
1	57306	Harness KC MP B-70 A	
1	57305	Harness A/D Converter	
1	57408	Harness KC MP B-72	
1	57409	Harness KC MP B-71	
1	55924	Decal CPU Warning 120VAC	
4	60768	Nut 6-32 ESNA #22NM-62 Plated	
4	70628	Nut 4-40 ESNA	
4	71319	Screw 6-32 x 1/4" Truss Phil SST	
4	71368	Standoff #6 x 3/4" 4538-632-B12	
1	57446	Decal KINCOM S-100 CPU	



REVISIONS					
REV.	EN. No.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01-20-95	Release for Production	BSB	
B	7397	02-15-95	Change Typestyle, Label Material and Adhesive	GLM	
C	7418	03-01-95	Change Connections for Compaq Computer	GLM	
D	7466	03-29095	Change F/B and U/D in Adjustments*	GLM	

NOTES

1. Material: MKS20 (2 mil)
2. Adhesive: UL Recognized Backing V-23
3. Black Ink Secoil Plas-Cal
4. Clear Laminated Fasson-Supercold Seal (1 mil)
5. All Lettering Vectored
6. All Corners to have .250" Radius
7. UL Recognized Marking and Labeling System
8. Tolerances: Fractions ±1/16, Decimals .XXX ±.015

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FRACT. ± 1/64 DEC. .xx ± .01 .xxx ± .005 ANGLES ± 1°

MATERIAL: MKS20 (2 mil) Adhesive V-23 Black Ink

FINISH

APPROVALS	DATE
ENGINEER BSBaxter	12-13-94
DRAWING G L Monks	02-15-95
CHECK B. Baxter	03-29-95
APPROVAL	3/30/95

CHATTANOOGA GROUP, INC.
4717 ADAMS ROAD
P.O. BOX 489
HIXSON, TN 37343-0489

TITLE: Decal KINCOM S-100 CPU

SIZE	SCALE	PLOT	SHEET	PART No.	REV
B	1 = 1	@1 = 1	1 of 1	57446	D

S-100 CPU Decal – 57446

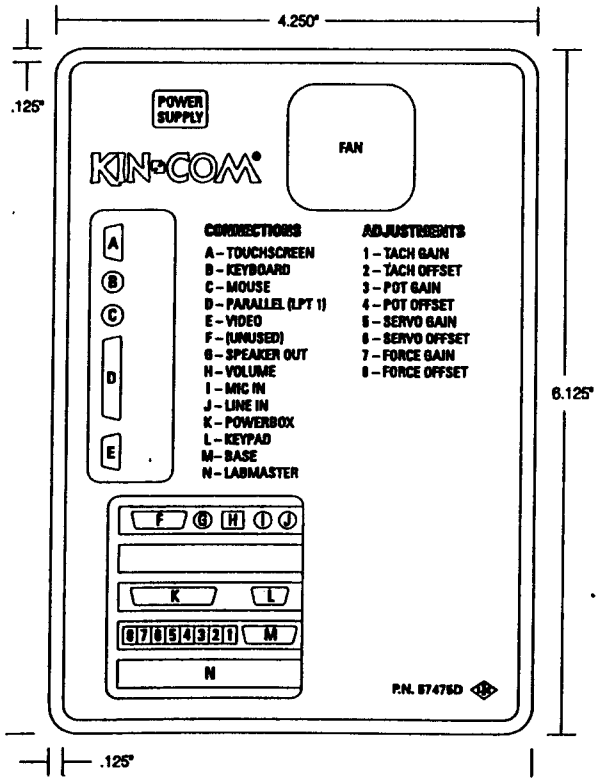
Chattanooga Group Computer Configuration

KIN-COM T-100 – 57472

PART No.	DESCRIPTION	LOCATION
57678	LABMASTER DMA A/D	SLOT-1
57286	PCB-70	SLOT-2
57561	PCB-70 HARNESS ASSY	SLOT-3
	VACANT	SLOT-4
51727	SOUNDBLASTER PCB	SLOT-5
57677	350 MEG TAPE BACKUP	BAY-2
	LABMASTER DAUGHTER PCB	BAY-1
57673	COMPAQ COMPUTER	
57674	COMPAQ MOUNTING RAILS	

Miscellaneous Parts Kit

QNTY	PART No.	DESCRIPTION	NOTES
4	20029	Screw 4-40 x 3/8" Flt Hd Phil SS	
1	51486	Brkt KC500H Daughter Board SMC	
1	57504	Software Enhanced Computer	
4	71368	Standoff #6 x 3/4" 4538-632-B12	
1	55193	Brkt, XTR 0915A	
1	57307	Harness KC MP B-70 B	
1	57306	Harness KC MP B-70 A	
1	57305	Harness A/D Converter	
1	57308	Harness KC MP B-70 Powerbox	Use 57561 as guide
1	57398	Harness KC MP B-70 Keypad	Use 57561 as guide
1	55924	Decal CPU Warning 120VAC	
4	60768	Nut 6-32 ESNA #22NM-62 Plated	
4	70628	Nut 4-40 ESNA	
4	71319	Screw 6-32 x 1/4" Truss Phil SST	
1	57475	Decal KINCOM T-100 CPU	



REVISIONS					
REV.	EN. No.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01-20-95	Release for Production	BSB	
B	7397	02-15-95	Change Typestyle, Label Material and Adhesive	GLM	
C	7418	03-01-95	Change Connections for Compaq Computer	GLM	
D	7466	03-29-95	Add Soundblaster	GLM	

NOTES

1. Material: MKS20 (2 mil)
2. Adhesive: UL Recognized Backing V-23
3. Black Ink Secoil Plas-Cal
4. Clear Laminated Fasson-Supercold Seal (1 mil)
5. All Lettering Vectored
6. All Corners to have .250" Radius
7. UL Recognized Marking and Labeling System
8. Tolerances: Fractions ±1/16, Decimals .XXX ±.015

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FRACT. ± 1/64 DEC. .xx ± .01 .xxx ± .005 ANGLES ± 1°

MATERIAL: MKS20 (2 mil) Adhesive V-23 Black Ink

FINISH

APPROVALS	DATE
ENGINEER BSBaxter	12-13-94
DRAWING G L Monks	02-15-95
CHECK B. Baxter	03-28-95
APPROVAL	3/30/95

CHATTANOOGA GROUP, INC.
4717 ADAMS ROAD
P.O. BOX 489
HIXSON, TN 37343-0489

TITLE: Decal KINCOM T-100 CPU

SIZE	SCALE	PLOT	SHEET	PART No.	REV
B	1 = 1	@1 = 1	1 of 1	57475	D

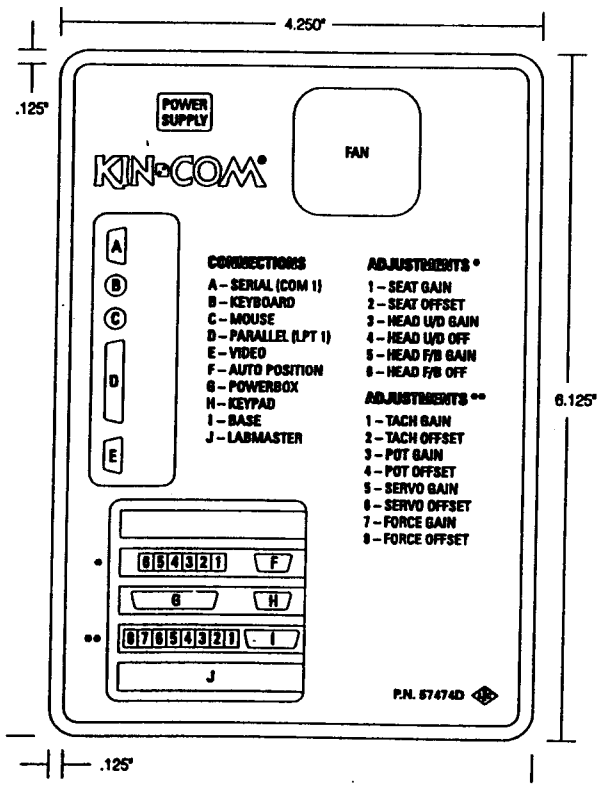
Chattanooga Group Computer Configuration

KIN-COM U-100 – 57473

PART No.	DESCRIPTION	LOCATION
57678	LABMASTER DMA A/D	SLOT-1
57286	PCB-70	SLOT-2
57342	PCB-71	SLOT-3
57346	PCB-72	SLOT-4
	VACANT	SLOT-5
	LABMASTER DAUGHTER PCB	BAY-1
57673	COMPAQ COMPUTER	
57674	COMPAQ MOUNTING RAILS	

Miscellaneous Parts Kit

QNTY	PART No.	DESCRIPTION	NOTES
4	20029	Screw 4-40 x 3/8" Flt Hd Phil SS	
1	51486	Brkt KC500H Daughter Board SMC	
1	57503	Software Standard Computer	
1	57307	Harness KC MP B-70 B	
1	57306	Harness KC MP B-70 A	
1	57305	Harness A/D Converter	
1	57408	Harness KC MP B-72	
1	57409	Harness KC MP B-71	
1	55924	Decal CPU Warning 120VAC	
4	60768	Nut 6-32 ESNA #22NM-62 Plated	
4	70628	Nut 4-40 ESNA	
4	71319	Screw 6-32 x 1/4" Truss Phil SST	
4	71368	Standoff #6 x 3/4" 4538-632-B12	
1	57474	Decal KINCOM U-100 CPU	



REVISIONS					
REV.	EN. No.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01-20-95	Release for Production	BSB	
B	7397	02-15-95	Change Typestyle, Label Material and Adhesive	GLM	
C	7418	03-01-95	Change Connections for Compaq Computer	GLM	
D	7466	03-29-95	Remove Soundblaster, Change F/B and U/D	GLM	7466

NOTES

1. Material: MKS20 (2 mil)
2. Adhesive: UL Recognized Backing V-23
3. Black Ink Secoil Plas-Cal
4. Clear Laminated Fasson-Supercold Seal (1 mil)
5. All Lettering Vectored
6. All Corners to have .250" Radius
7. UL Recognized Marking and Labeling System
8. Tolerances: Fractions ±1/16, Decimals .XXX ±.015

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MATERIAL: MKS20 (2 mil) Adhesive V-23 Black Ink

FINISH

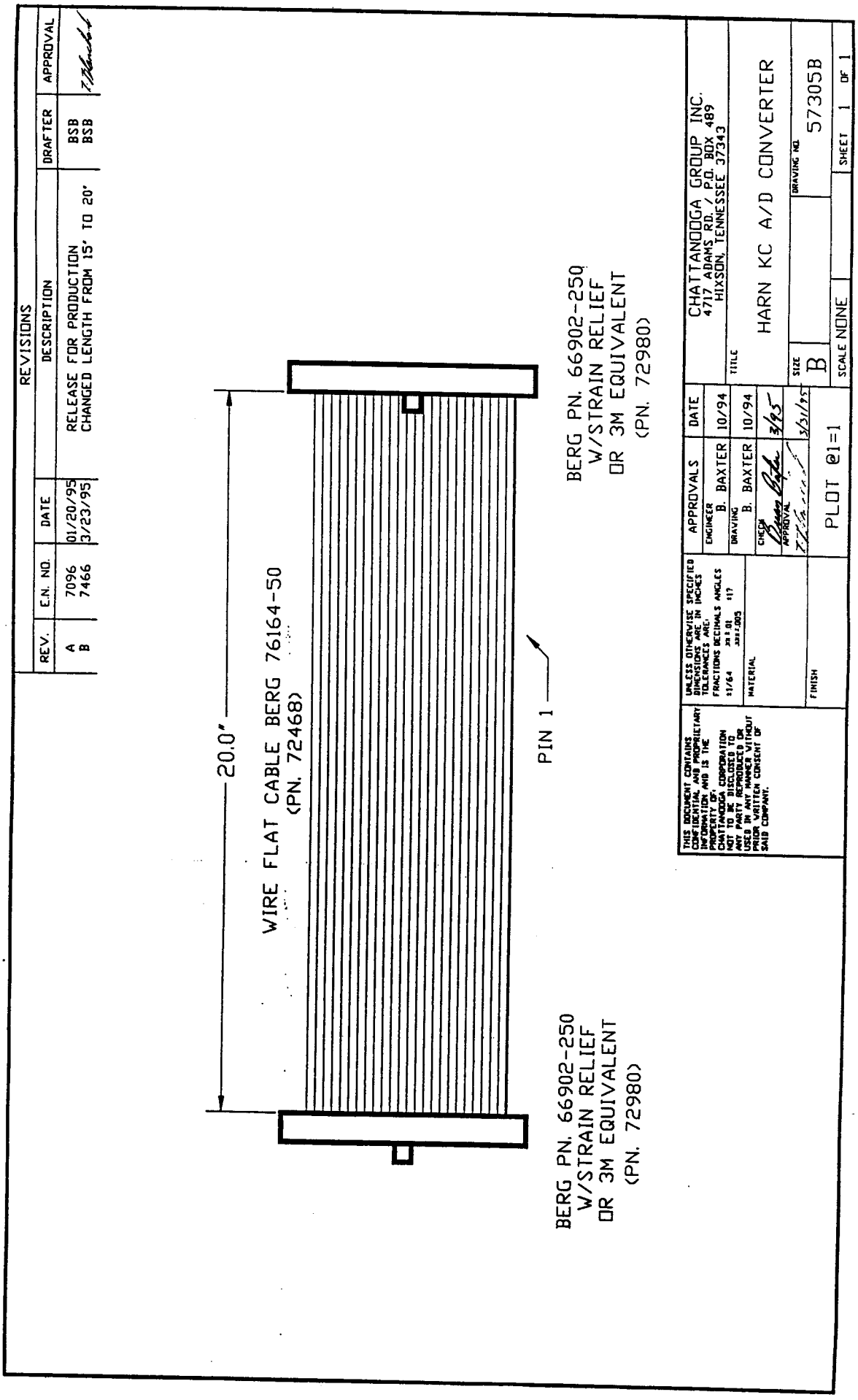
APPROVALS	DATE
ENGINEER BSBaxter	12-13-94
DRAWING G L Monks	02-15-95
CHECK B. Baxter	03-28-95
APPROVAL	3/30/95

CHATTANOOGA GROUP, INC.
4717 ADAMS ROAD
P.O. BOX 489
HIXSON, TN 37343-0489

TITLE: Decal KINCOM U-100 CPU

SIZE	SCALE	PLOT	SHEET	PART No.	REV
B	1 = 1	@1 = 1	1 of 1	57474	D

U-100 CPU Decal – 57474


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | RELEASE FOR PRODUCTION | BSB
B | 7466 | 3/23/95 | CHANGED LENGTH FROM 15" TO 20" | BSB
20.0"
WIRE FLAT CABLE BERG 76164-50
(PN. 72468)
PIN 1
BERG PN. 66902-250
W/STRAIN RELIEF
OR 3M EQUIVALENT
(PN. 72980)
BERG PN. 66902-250
W/STRAIN RELIEF
OR 3M EQUIVALENT
(PN. 72980)
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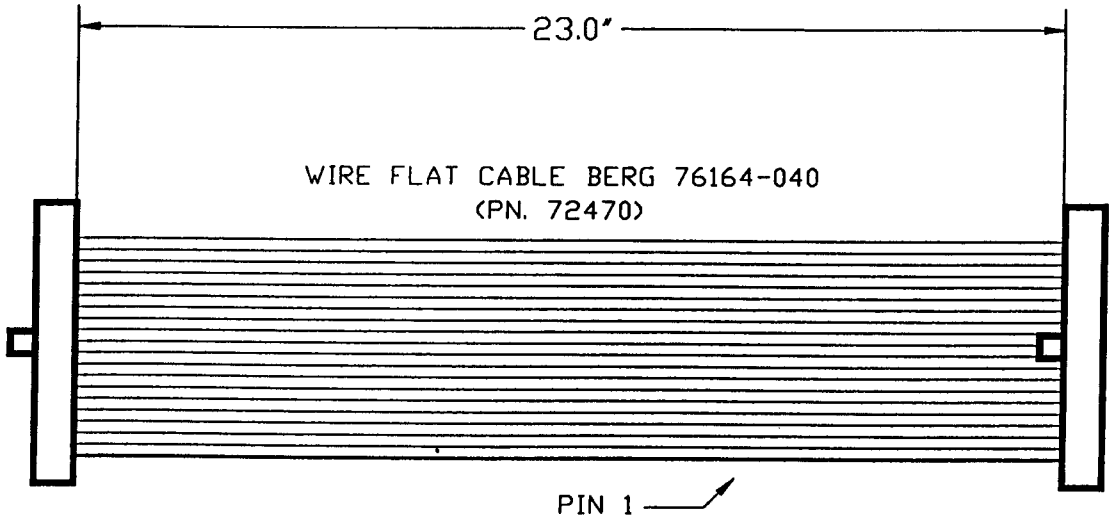
MATERIAL
FINISH
APPROVALS | DATE
ENGINEER B. BAXTER 10/94
DRAWING B. BAXTER 10/94
CHECK APPROVAL 3/95
3/31/95
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARN KC A/D CONVERTER
SIZE B
DRAWING NO. 57305B
SCALE NONE
SHEET 1 OF 1

REVISIONS					
REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01/20/95	RELEASE FOR PRODUCTION	BSB	
B	7466	3/23/95	CHANGED LENGTH FROM 20 TO 23	BSB	



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TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 XX ±.01 ±1°
XXX ±.005

MATERIAL

FINISH

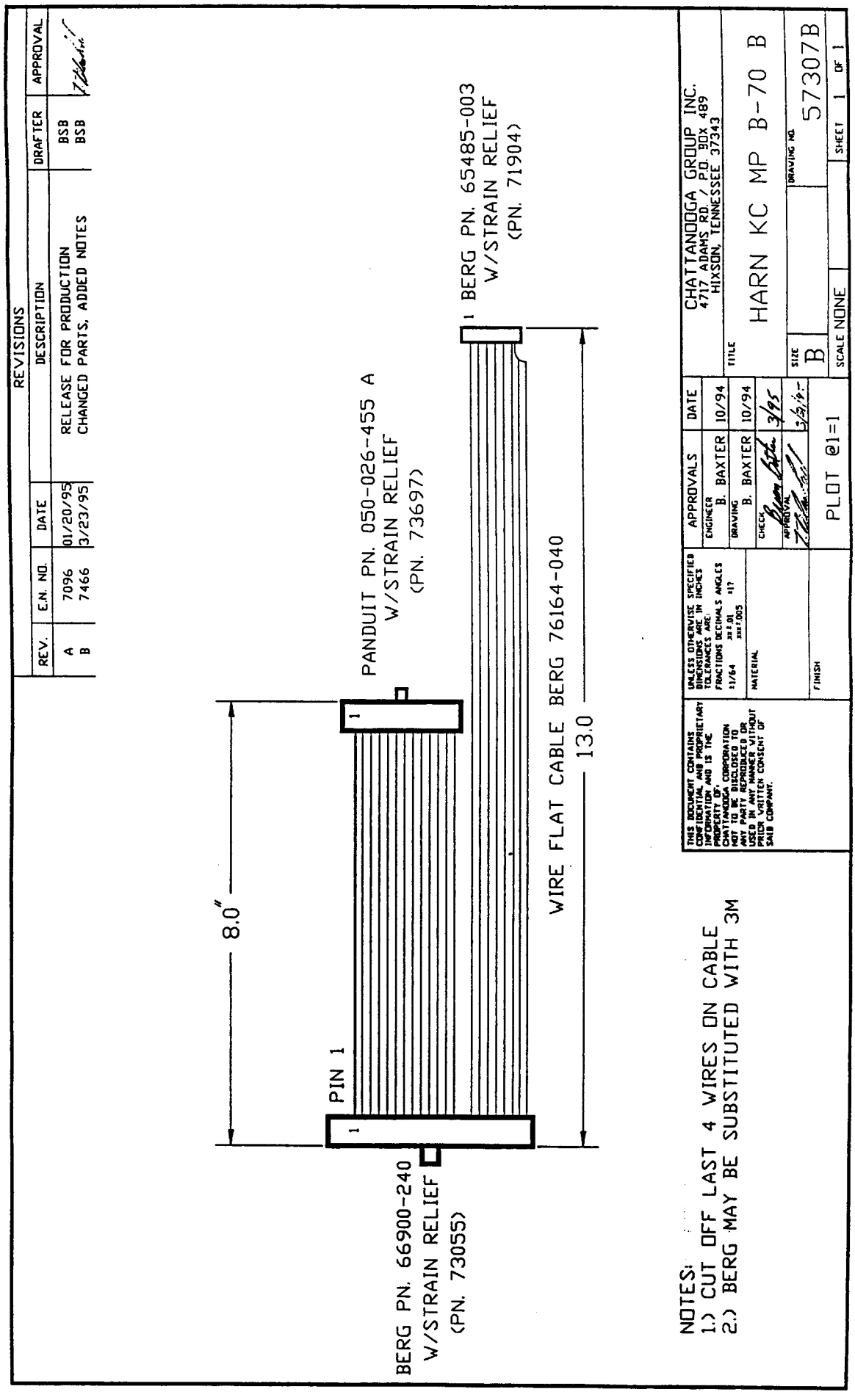
APPROVALS	DATE
ENGINEER B. BAXTER	10/94
DRAWING B. BAXTER	10/94
CHECK	3/95
APPROVAL	3/1/95

PLOT @1=1

CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343

TITLE
HARN KC MP B-70 A

SIZE B | DRAWING NO. 57306B | SCALE NONE | SHEET 1 OF 1


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | RELEASE FOR PRODUCTION | BSB
B | 7466 | 3/23/95 | CHANGED PARTS, ADDED NOTES | BSB
PANDUIT PN. 050-026-455 A
W/STRAIN RELIEF
(PN. 73697)
1 BERG PN. 65485-003
W/STRAIN RELIEF
(PN. 71904)
8.0"
WIRE FLAT CABLE BERG 76164-040
13.0
PIN 1
BERG PN. 66900-240
W/STRAIN RELIEF
(PN. 73055)
NOTES:
1.) CUT OFF LAST 4 WIRES ON CABLE
2.) BERG MAY BE SUBSTITUTED WITH 3M
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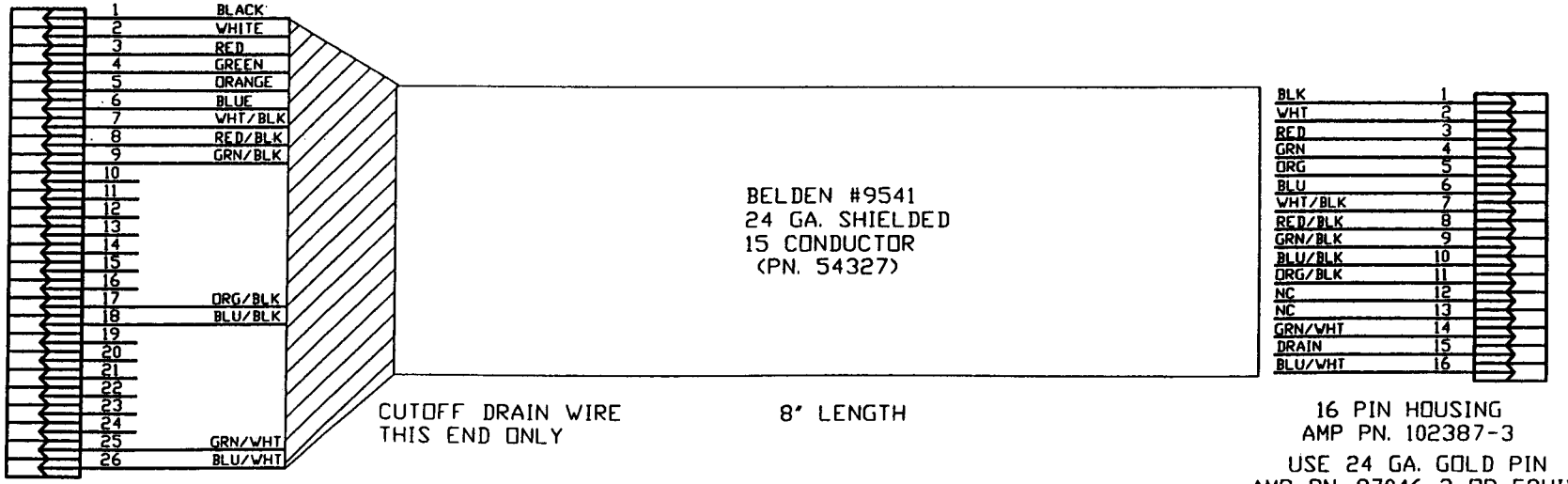
MATERIAL
FINISH
APPROVALS | DATE
ENGINEER B. BAXTER 10/94
DRAWING B. BAXTER 10/94
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARN KC MP B-70 B
SIZE B
DRAWING NO. 57307B
SCALE NONE
SHEET 1 OF 1

REVISIONS					
REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01/20/95	RELEASE FOR PRODUCTION	BSB	FB
B	7466	3/23/95	ADDED INTERNAL PART NO.S	BSB	FB
C	7506	5/03/95	SWAPPED PINS 10 & 11	BSB	FB
D	7551	5/31/95	DELETED WIRE ON PINS 12 & 13	BSB	



CUTOFF DRAIN WIRE
THIS END ONLY

8" LENGTH

26 PIN HDP-22
AMP PN. 748566-1
USE 22 - 28 GA. GOLD SOCKET
AMP PN. 748610-7 OR EQUIV.
(PN. 54885)

16 PIN HOUSING
AMP PN. 102387-3
USE 24 GA. GOLD PIN
AMP PN. 87046-3 OR EQUIV.
(PN. 54323 & 54325)

NOTE: CUTOFF BLK/WHT AND RED/WHT WIRES

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UNLESS OTHERVISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 .xx ±.01 ±1° .xxx ±.005

MATERIAL

FINISH

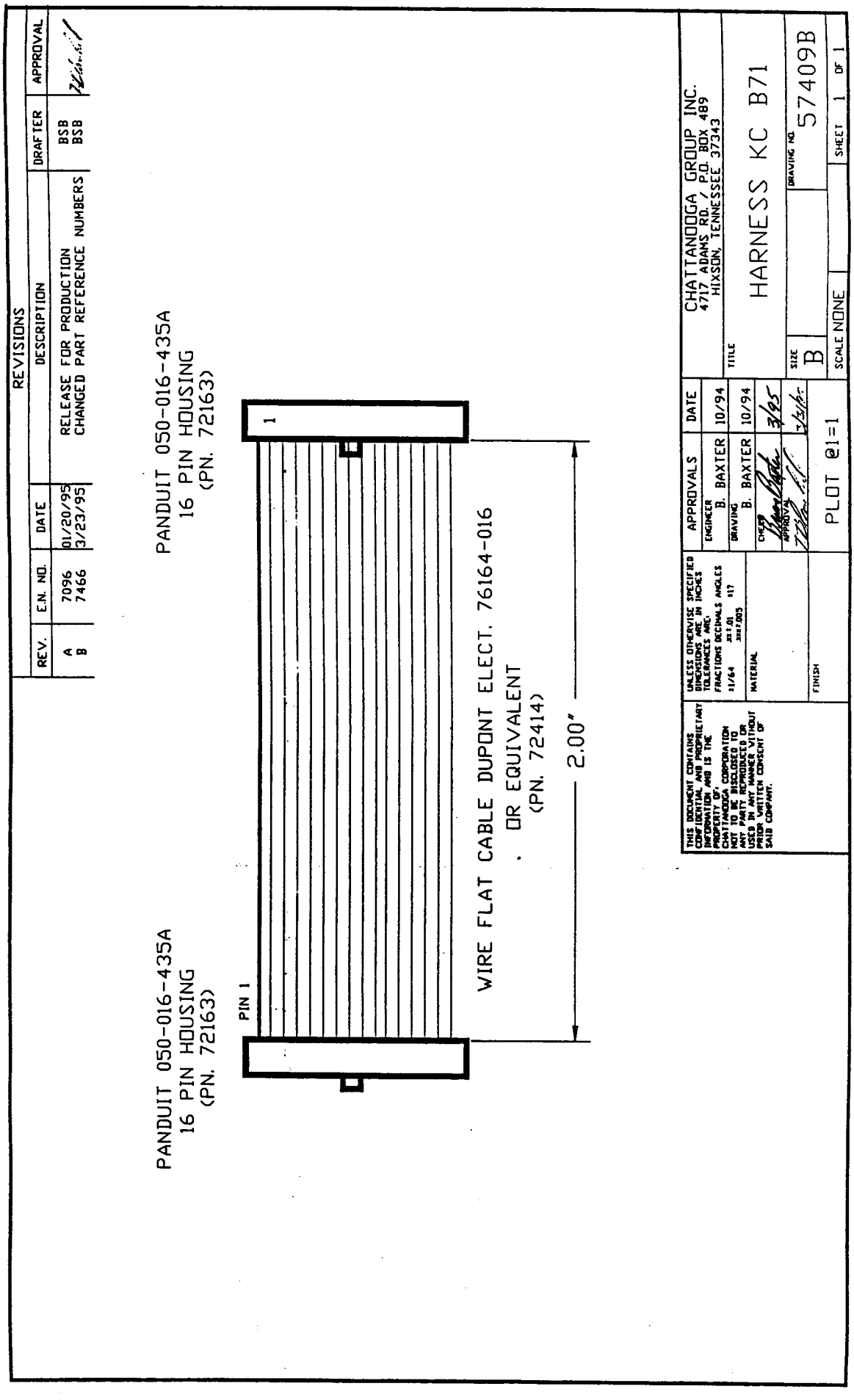
APPROVALS	DATE
ENGINEER BSBAXTER	12/94
DRAWING BSBAXTER	12/94
CHECK APPROVAL	5/31/95

PLOT @1=1

CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343

TITLE: HARN KC MP B-70 PWR

SIZE B | DRAWING NO. 57308D | SCALE NONE | SHEET 1 OF 1


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | RELEASE FOR PRODUCTION | BSB
B | 7466 | 3/23/95 | CHANGED PART REFERENCE NUMBERS | BSB
PANDUIT 050-016-435A
16 PIN HOUSING
(PN. 72163)
PANDUIT 050-016-435A
16 PIN HOUSING
(PN. 72163)
PIN 1
1
WIRE FLAT CABLE DUPONT ELECT. 76164-016
OR EQUIVALENT
(PN. 72414)
2.00"
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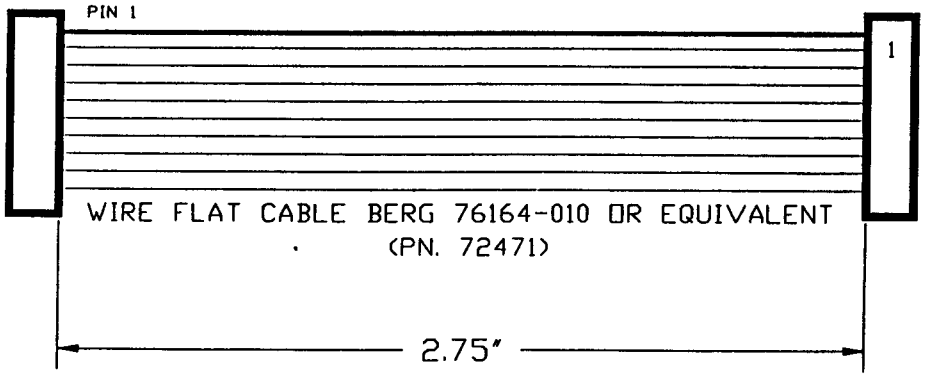
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 ±.01 ±1°
.XX ±.005
MATERIAL
FINISH
APPROVALS | DATE
ENGINEER B. BAXTER 10/94
DRAWING B. BAXTER 10/94
CHECK 3/25
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARNESS KC B71
SIZE B
DRAWING NO. 57409B
SCALE NONE
SHEET 1 OF 1

REVISIONS					
REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01/20/95	RELEASE FOR PRODUCTION	BSB	

BERG 65-485-003 OR EQUIV.
10 PIN HOUSING
(PN. 71904)

BERG 65-485-003 OR EQUIV.
10 PIN HOUSING
(PN. 71904)



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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 .XX ±.01 ±1°
.XXX ±.005

MATERIAL

FINISH

APPROVALS	DATE
ENGINEER B. BAXTER	10/94
DRAWING B. BAXTER	10/94
CHECK	
APPROVAL	

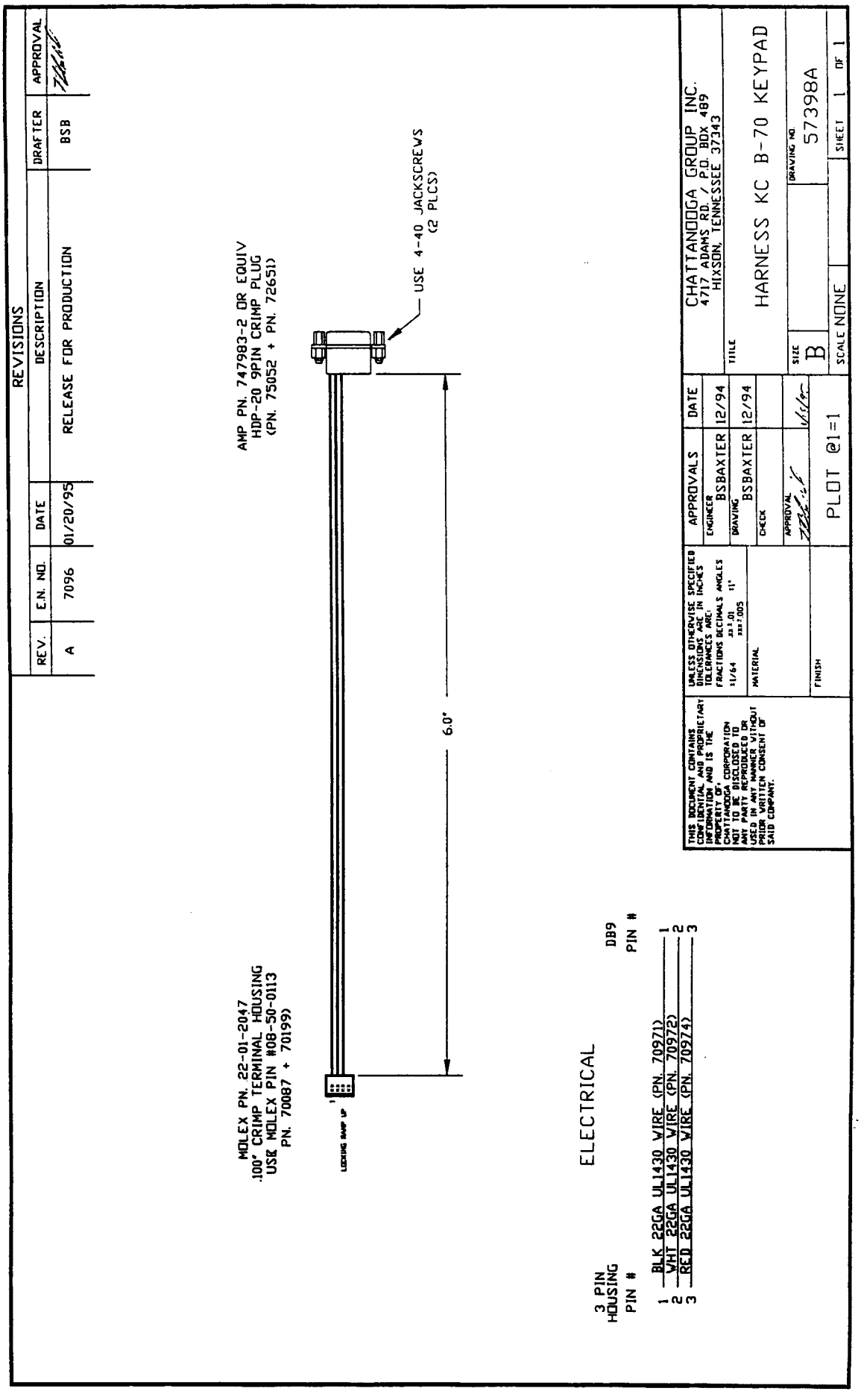
PLOT @1=1

CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343

TITLE
HARNESS KC B-72

SIZE B | DRAWING NO. 57408A

SCALE NONE | SHEET 1 OF 1


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 01/20/95 | RELEASE FOR PRODUCTION | BSB
AMP PN. 747983-2 OR EQUIV
HDP-20 9PIN CRIMP PLUG
(PN. 75052 + PN. 72651)
USE 4-40 JACKSCREWS
(2 PLCS)
6.0"
LOCKING RAMP UP
MOLEX PN. 22-01-2047
.100" CRIMP TERMINAL HOUSING
USE MOLEX PIN #08-50-0113
PN. 70087 + 70199)
ELECTRICAL
DB9
PIN #
3 PIN
HOUSING
PIN #
1 BLK 22GA UL1430 WIRE (PN. 70971) 1
2 WHT 22GA UL1430 WIRE (PN. 70972) 2
3 RED 22GA UL1430 WIRE (PN. 70974) 3
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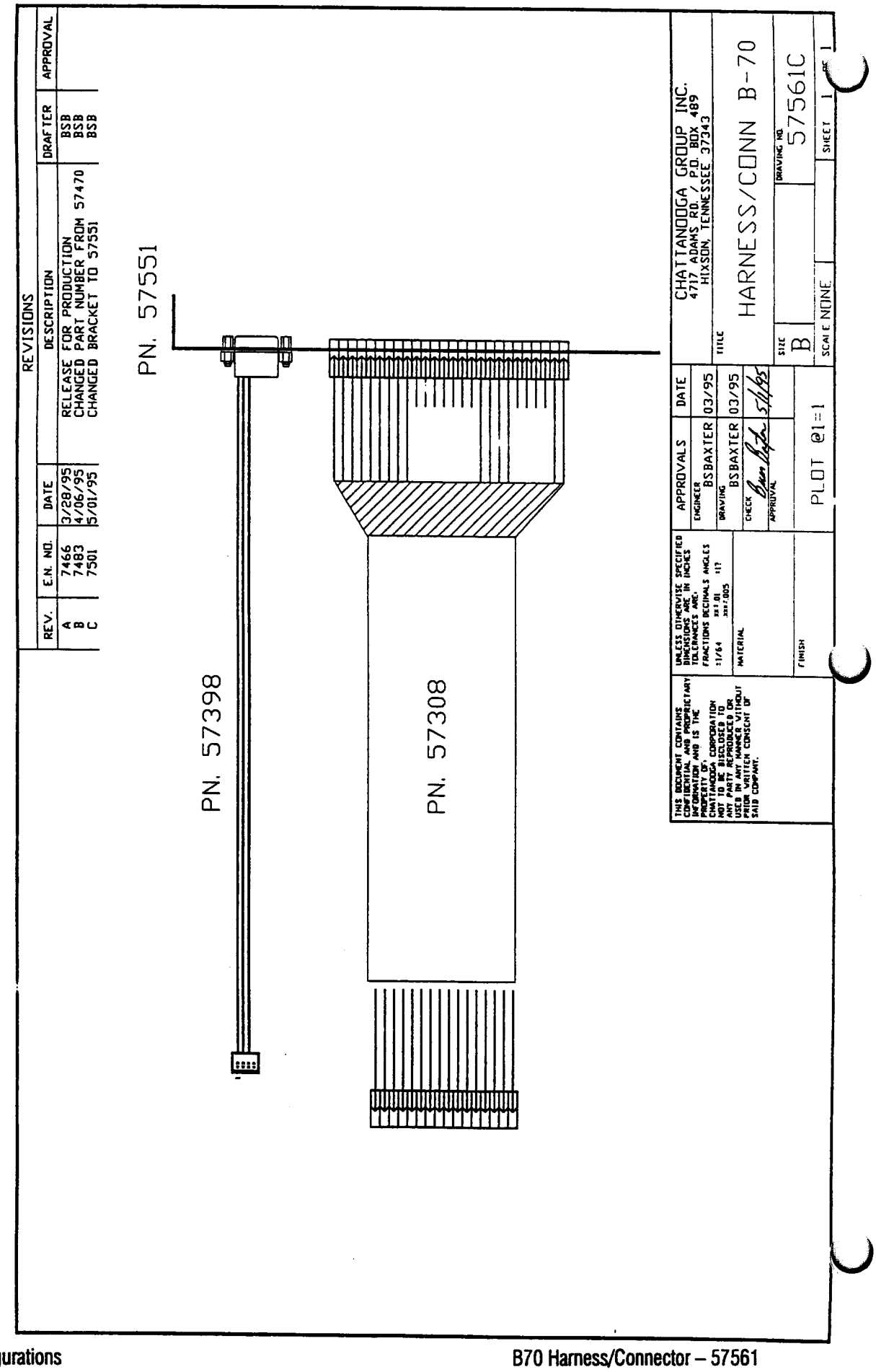
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
1/64 .XX±.01 ±1°
.XXX±.005
MATERIAL
FINISH
APPROVALS DATE
ENGINEER BSBAXTER 12/94
DRAWING BSBAXTER 12/94
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARNESS KC B-70 KEYPAD
SIZE B
DRAWING NO. 57398A
SCALE NONE
SHEET 1 OF 1


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7466 | 3/28/95 | RELEASE FOR PRODUCTION | BSB
B | 7483 | 4/06/95 | CHANGED PART NUMBER FROM 57470 | BSB
C | 7501 | 5/01/95 | CHANGED BRACKET TO 57551 | BSB
PN. 57551
PN. 57398
PN. 57308
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
APPROVALS
DATE
ENGINEER BSBAXTER 03/95
DRAWING BSBAXTER 03/95
CHECK
APPROVAL
TITLE
HARNESS/CONN B-70
SIZE B
DRAWING NO. 57561C
SCALE NONE
SHEET 1 OF 1
PLOT @1=1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 ±.01 ±1°
MATERIAL
FINISH
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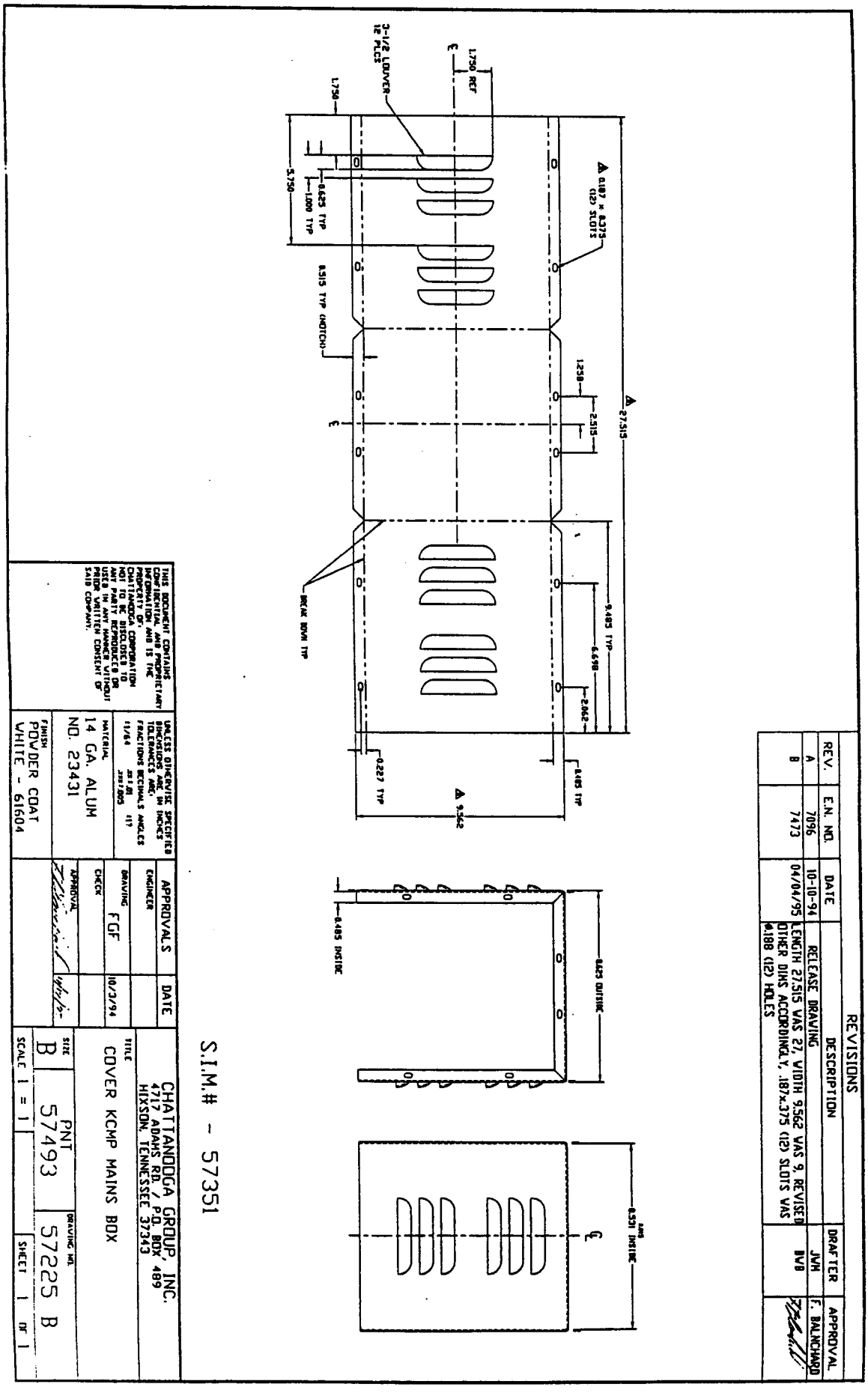
SECTION

6

Mains Box

MP Mains Box Cover – 57225



REVISIONS					
REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	10-10-94	RELEASE DRAWING	JWH	F. BALANCHARD
B	7473	04/04/95	LENGTH 27.515 WAS 27, WIDTH 9.562 WAS 9. REVISED OTHER DIMS ACCORDINGLY. .187x.375 (12) SLOTS WAS .188 (12) HOLES	BWB	

S.I.M.# - 57351

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES 11/64 .XXX ±.005 ±1°

MATERIAL 14 GA. ALUM NO. 23431

FINISH POWDER COAT WHITE - 61604

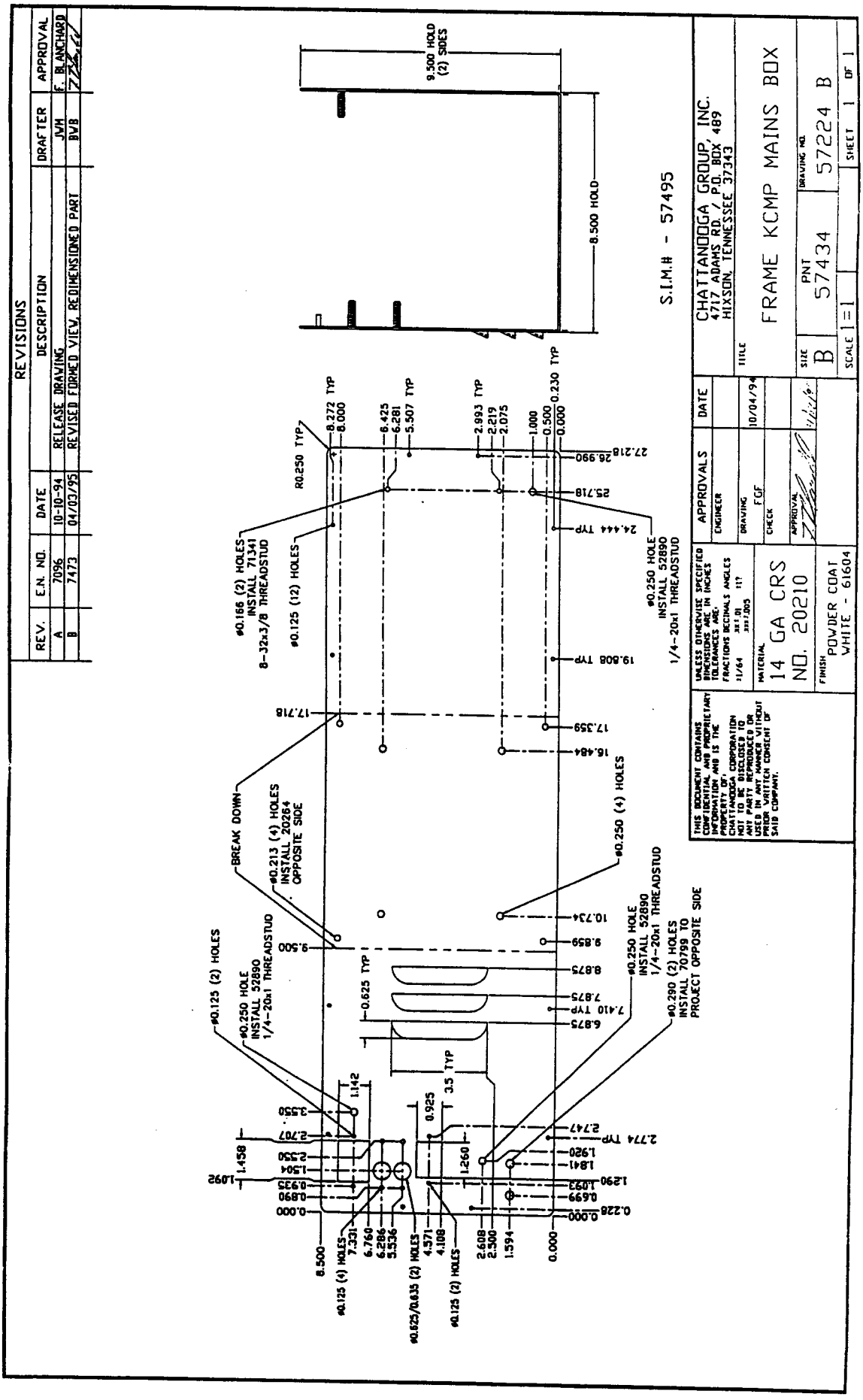
APPROVALS		DATE
ENGINEER		
DRAWING	FGF	10/3/94
CHECK		
APPROVAL		

CHATTANOOGA GROUP, INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343

TITLE COVER KCMP MAINS BOX

SIZE B | PNT 57493 | DRAWING NO. 57225 B

SCALE 1 = 1 | SHEET 1 OF 1


REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7096 | 10-10-94 | RELEASE DRAWING | JVH | F. BLANCHARD
B | 7473 | 04/03/95 | REVISED FORMED VIEW, REDIMENSIONED PART | BVB
S.I.M.# - 57495
9.500 HOLD (2) SIDES
8.500 HOLD
R0.250 TYP
#0.166 (2) HOLES INSTALL 71341 8-32x3/8 THREADSTUD
#0.125 (12) HOLES
#0.250 HOLE INSTALL 52890 1/4-20x1 THREADSTUD
BREAK DOWN
#0.213 (4) HOLES INSTALL 20264 OPPOSITE SIDE
#0.250 (4) HOLES
#0.125 (2) HOLES
#0.250 HOLE INSTALL 52890 1/4-20x1 THREADSTUD
#0.290 (2) HOLES INSTALL 70799 TO PROJECT OPPOSITE SIDE
#0.125 (4) HOLES
#0.625/0.635 (2) HOLES
#0.125 (2) HOLES
0.625 TYP
3.5 TYP
CHATTANOOGA GROUP, INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
FRAME KCMP MAINS BOX
SIZE B
PNT 57434
DRAWING NO. 57224 B
SCALE 1=1
SHEET 1 OF 1
APPROVALS | DATE
ENGINEER
DRAWING FGF 10/04/94
CHECK
APPROVAL
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 .XX ±.01 .XXX ±.005 ±1°
MATERIAL 14 GA CRS NO. 20210
FINISH POWDER COAT WHITE - 61604
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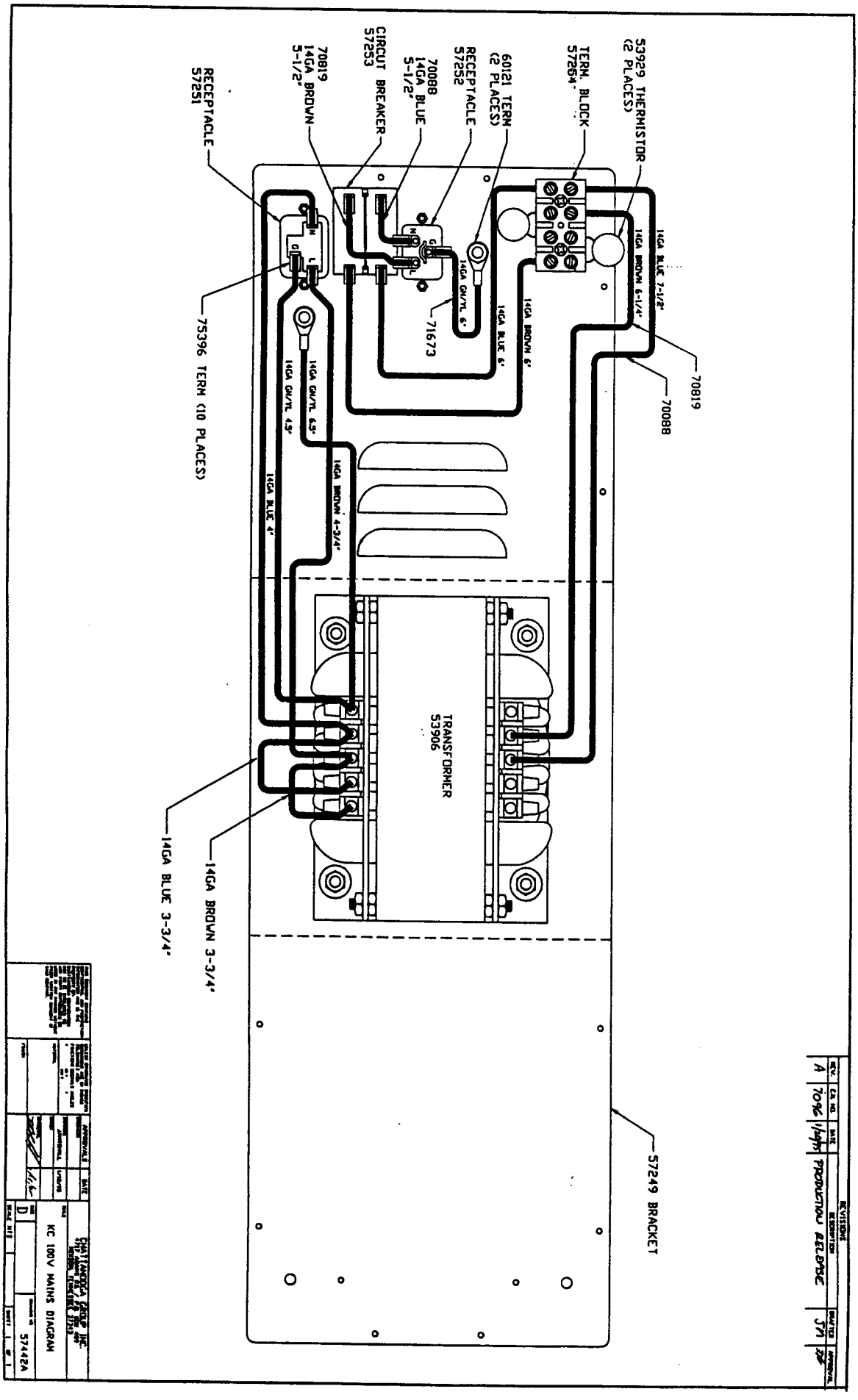
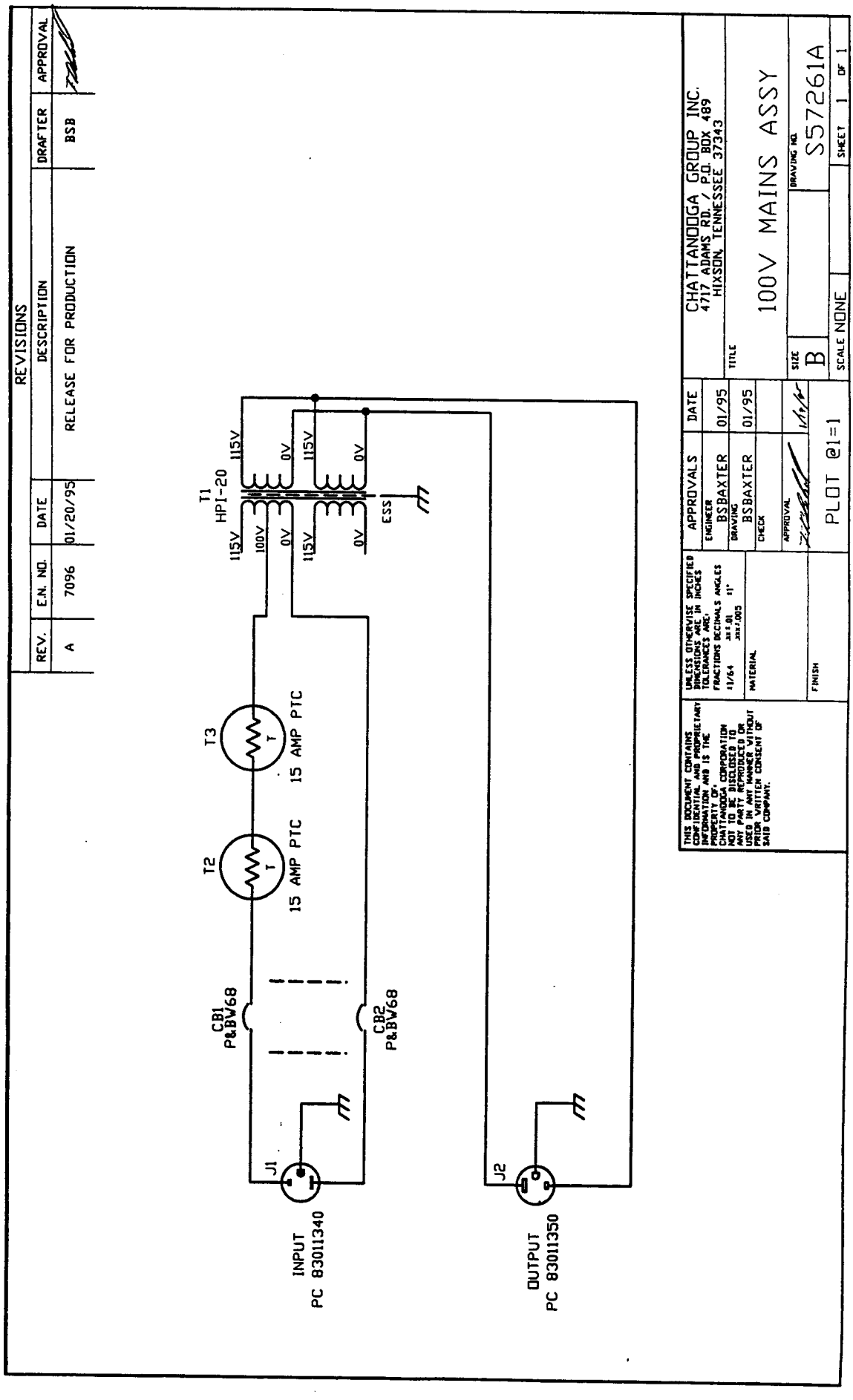
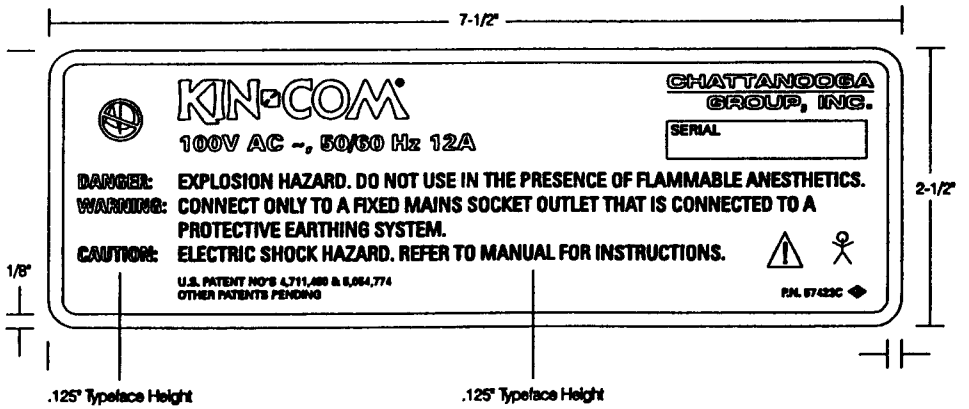
100V Mains Diagram – 57442



100V Mains Assembly – 57261



REVISIONS					
REV.	EN. No.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01-20-95	Release for Production	BSB	
B	7397	02-15-95	Change Typestyle, Label Material and Adhesive		
C	7403	02-22-95	Remove "MP", Add "50" for Hz		



NOTES
1. Material: MKS20 (2 mil)
2. Adhesive: UL Recognized Backing V-23
3. Black Ink Secoll Plas-Cal
4. Clear Laminated Fasson-Supercold Seal (1 mil)
5. All Lettering Vectored
6. All Corners to have .250" Radius
7. UL Recognized Marking and Labeling System
8. Tolerances: Fractions ±1/16, Decimals .XXX ±.015
9. Serial No.'s Per PO

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FRACT. ± 1/64 DEC. .XX ± .01 .XXX ± .005 ANGLES ± 1°

MATERIAL: MKS20 (2 mil) Adhesive V-23 Black Ink

FINISH:

APPROVALS	DATE
ENGINEER BSBaxter	12-12-94
DRAWING G L Monks	02-22-95
CHECK	
APPROVAL	2/23/95

CHATTANOOGA GROUP, INC.
4717 ADAMS ROAD
P.O. BOX 489
HIXSON, TN 37343-0489

TITLE: Decal KINCOM Ser. 100V

SIZE	SCALE	PLOT	SHEET	PART No.	REV
B	1 = 1	@1 = 1	1 of 1	57423	C

100V Serial Decal – 57423

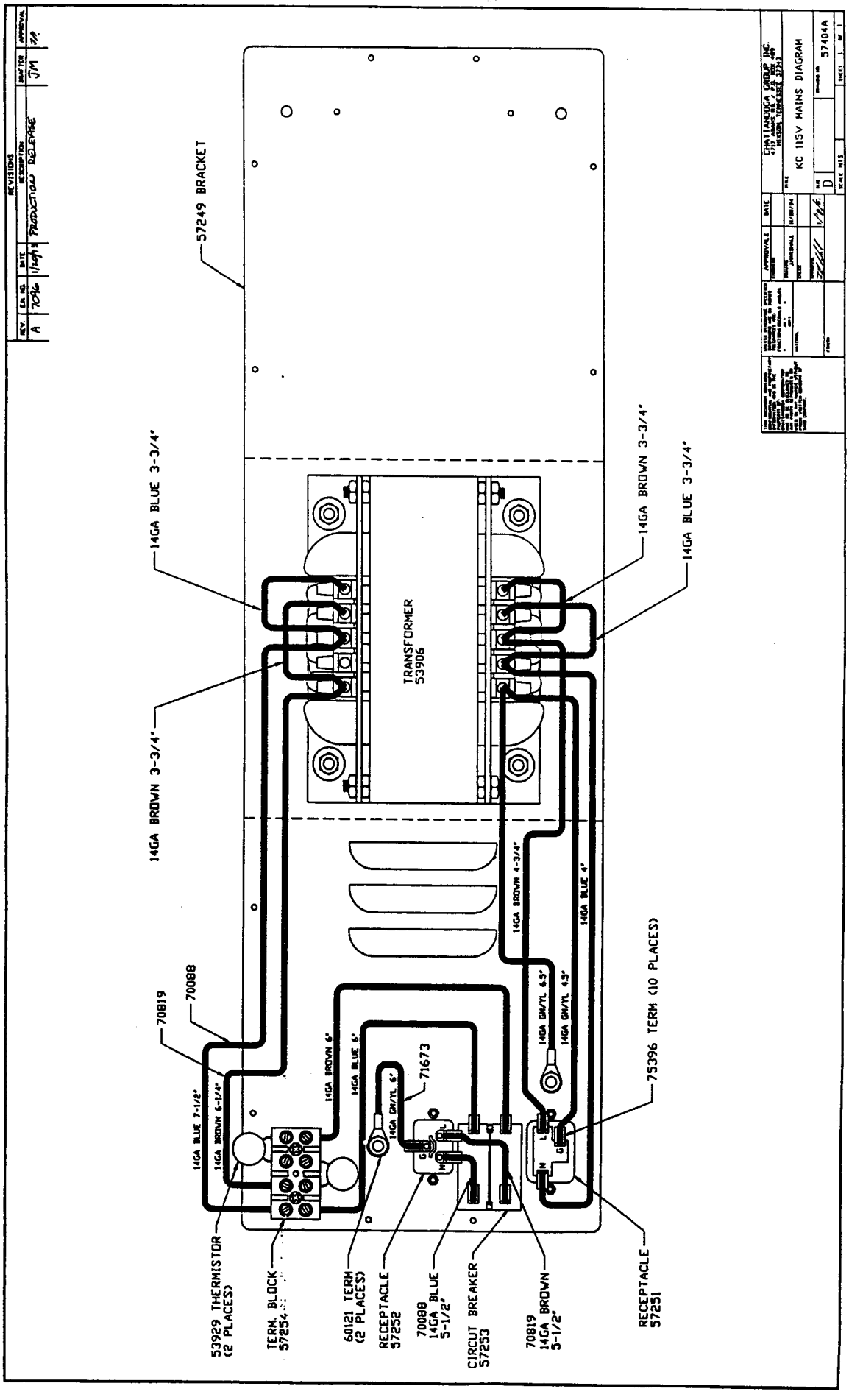
100V Mains Box Bill of Materials for 57261

QNTY	PART No.	DESCRIPTION	NOTES
1	57249	Sheetmetal Base, Painted	
1	57250	Sheetmetal Cover, Painted	
1	53906	Transformer, Signal HPI-20	
1	57251	Receptacle, PC 83011350	
1	57252	Receptacle, PC 83011340	
1	57253	Circuit Breaker, P&B	
1	57254	Terminal Block, 4 Pos	
2	73168	Washers #8 Flat Plated	
2	21808	Screw #8 x 1" Trusshead	
4	60016	Screw .25" - 20 x .75"	
4	21387	Washer .25" Flat	
4	70208	Nut .25" - 20 ESNA	
2	53929	Thermistor PTC 15 AMP	
2	60415	Nut .25" - 20 Keeper	
12	71592	Screw #6 x 3/8" Self Tap	
2	75385	Terminal .25" Ring #14	
10	74099	Terminal .25" Faston Blue	
4	20029	Screw 4-40 x 3/8" Flathead	
4	70628	Nut 4-40 ESNA	
4	21021	Screw 6-32 x 3/16" Pn Hd	
1	57255	Decal 115V Serial No	
1	57454	Kit 100V	
4	71314	Screw 6-32 x 1/2" Turss Phil SS	
4	75538	Foot Rubber W/Washer	
2	60419	Washer .25" Int Star	

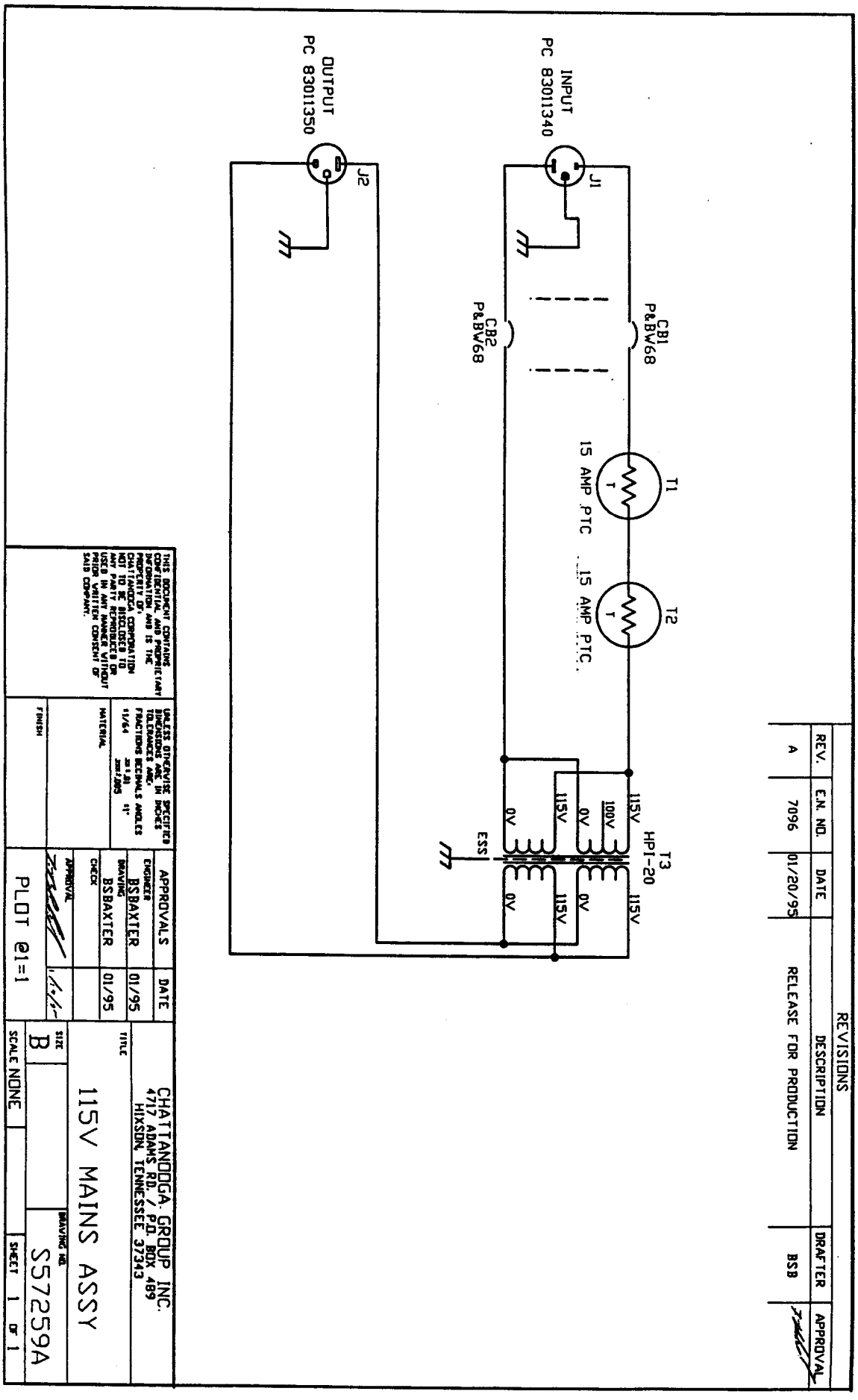
MP 100V Transformer – 57454

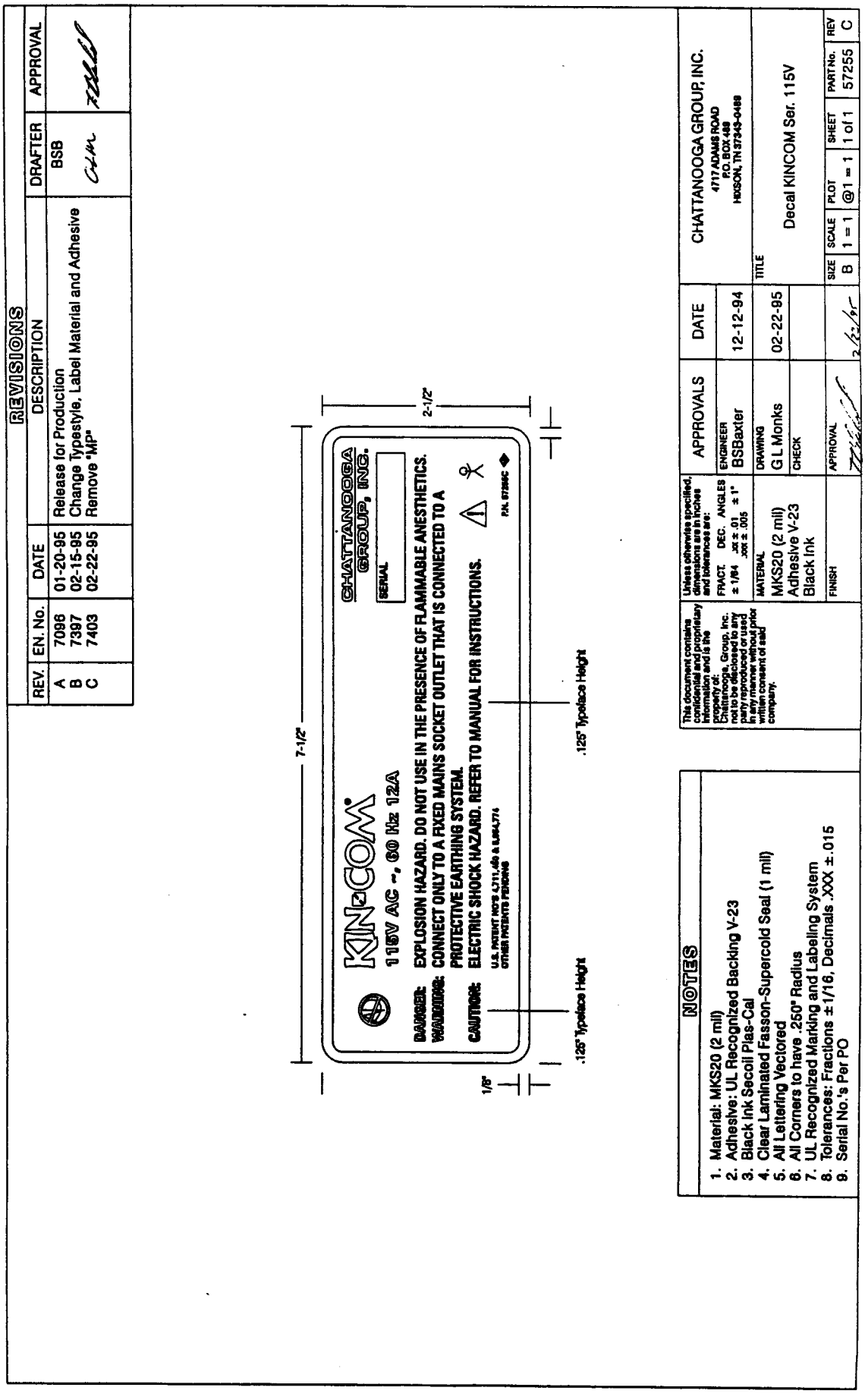
QNTY	SIZE	COLOR	LENGTH	OPERATION
1	14 AWG	BRN	3.75	STRIP BOTH ENDS
1	14 AWG	BRN	4.75"	STRIP AND TERM (75396)
1	14 AWG	BRN	5.50"	TERM BOTH ENDS (75396)
1	14 AWG	BRN	6.25"	STRIP BOTH ENDS
1	14 AWG	BLU	3.75"	STRIP BOTH ENDS
1	14 AWG	BLU	4.00"	STRIP AND TERM (75396)
1	14 AWG	BLU	5.50"	TERM BOTH ENDS (75396)
1	14 AWG	BLU	6.00"	STRIP AND TERM (75396)
1	14 AWG	BLU	7.50"	STRIP BOTH ENDS
1	14 AWG	GRN/YEL	4.50"	STRIP AND TERM (75396)
1	14 AWG	GRN/YEL	6.00"	TERM BOTH ENDS (75396 & 60121)
1	14 AWG	GRN/YEL	6.50"	STRIP AND TERM (60121)
				75396 = FASTON, .250, 16-14, 3-52046
				60121 = RING TERM, .250, 16-14, STD 31904

115V Mains Diagram – 57404



115V Mains Assembly – 57259




REVISIONS
REV. | EN. No. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A 7096 01-20-95 Release for Production
B 7397 02-15-95 Change Typestyle, Label Material and Adhesive
C 7403 02-22-95 Remove "MP"
BSB
7-1/2"
2-1/2"
KIN-COM
CHATTANOOGA GROUP, INC.
115V AC ~, 60 Hz 12A
SERIAL
DANGER: EXPLOSION HAZARD. DO NOT USE IN THE PRESENCE OF FLAMMABLE ANESTHETICS.
WARNING: CONNECT ONLY TO A FIXED MAINS SOCKET OUTLET THAT IS CONNECTED TO A PROTECTIVE EARTHING SYSTEM.
CAUTION: ELECTRIC SHOCK HAZARD. REFER TO MANUAL FOR INSTRUCTIONS.
P.N. 57255
U.S. PATENT NOS 4,711,469 & 5,064,771
OTHER PATENTS PENDING
1/8"
.125" Typeface Height
.125" Typeface Height
NOTES
1. Material: MKS20 (2 mil)
2. Adhesive: UL Recognized Backing V-23
3. Black Ink Secoll Plas-Cal
4. Clear Laminated Fasson-Supercold Seal (1 mil)
5. All Lettering Vectored
6. All Corners to have .250" Radius
7. UL Recognized Marking and Labeling System
8. Tolerances: Fractions ±1/16, Decimals .XXX ±.015
9. Serial No.'s Per PO
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FRACT. DEC. ANGLES
± 1/64 .XX ± .01 ± 1°
.XXX ± .005
MATERIAL
MKS20 (2 mil)
Adhesive V-23
Black Ink
FINISH
APPROVALS
ENGINEER BSBaxter 12-12-94
DRAWING G L Monks 02-22-95
CHECK
APPROVAL
DATE
CHATTANOOGA GROUP, INC.
4717 ADAMS ROAD
P.O. BOX 488
HIXSON, TN 37343-0488
TITLE
Decal KINCOM Ser. 115V
SIZE B
SCALE 1 = 1
PLOT @1 = 1
SHEET 1 of 1
PART No. 57255
REV C

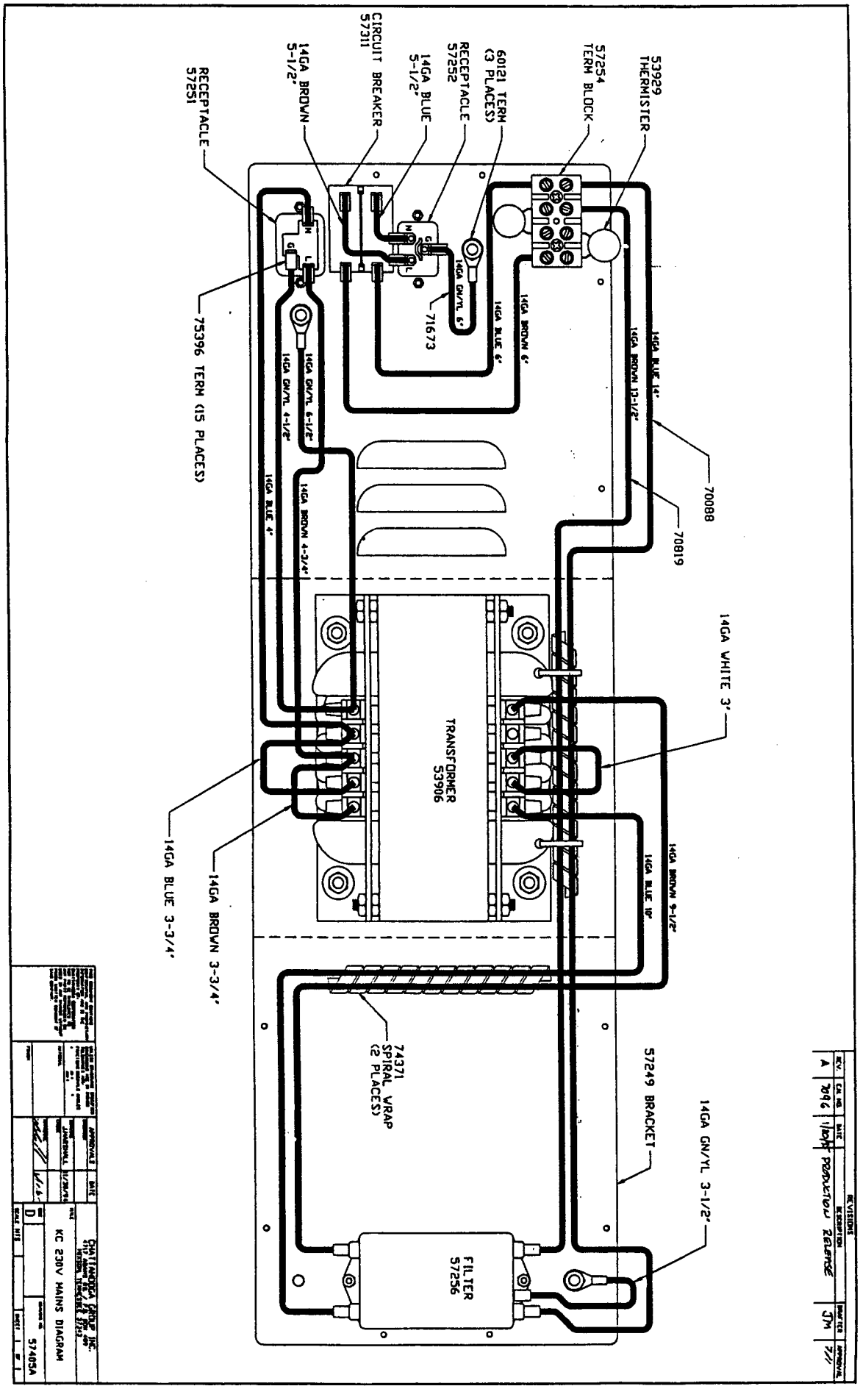
115V Mains Box Bill of Materials for 57259

QNTY	PART No.	DESCRIPTION	NOTES
1	57249	Sheetmetal Base, Painted	
1	57250	Sheetmetal Cover, Painted	
1	53906	Transformer, Signal HPI-20	
1	57251	Receptacle, PC 83011350	
1	57252	Receptacle, PC 83011340	
1	57253	Circuit Breaker, P&B	
1	57254	Terminal Block, 4 Pos	
2	73168	Washers #8 Flat Plated	
2	21808	Screw #8 x 1" Trusshead	
4	60016	Screw .25" - 20 x .75"	
4	21387	Washer .25" Flat	
4	70208	Nut .25" - 20 ESNA	
2	53929	Thermistor PTC 15 AMP	
2	60415	Nut .25" - 20 Keeper	
12	71592	Screw #6 x 3/8" Self Tap	
2	75385	Terminal .25" Ring #14	
10	74099	Terminal .25" Faston Blue	
4	20029	Screw 4-40 x 3/8" Flathead	
4	70628	Nut 4-40 ESNA	
4	21021	Screw 6-32 x 3/16" Pn Hd	
1	57255	Decal 115V Serial No	
1	57453	Kit 105V	
4	71314	Screw 6-32 x 1/2" Turss Phil SS	
4	75538	Foot Rubber W/Washer	
2	60419	Washer .25" Int Star	

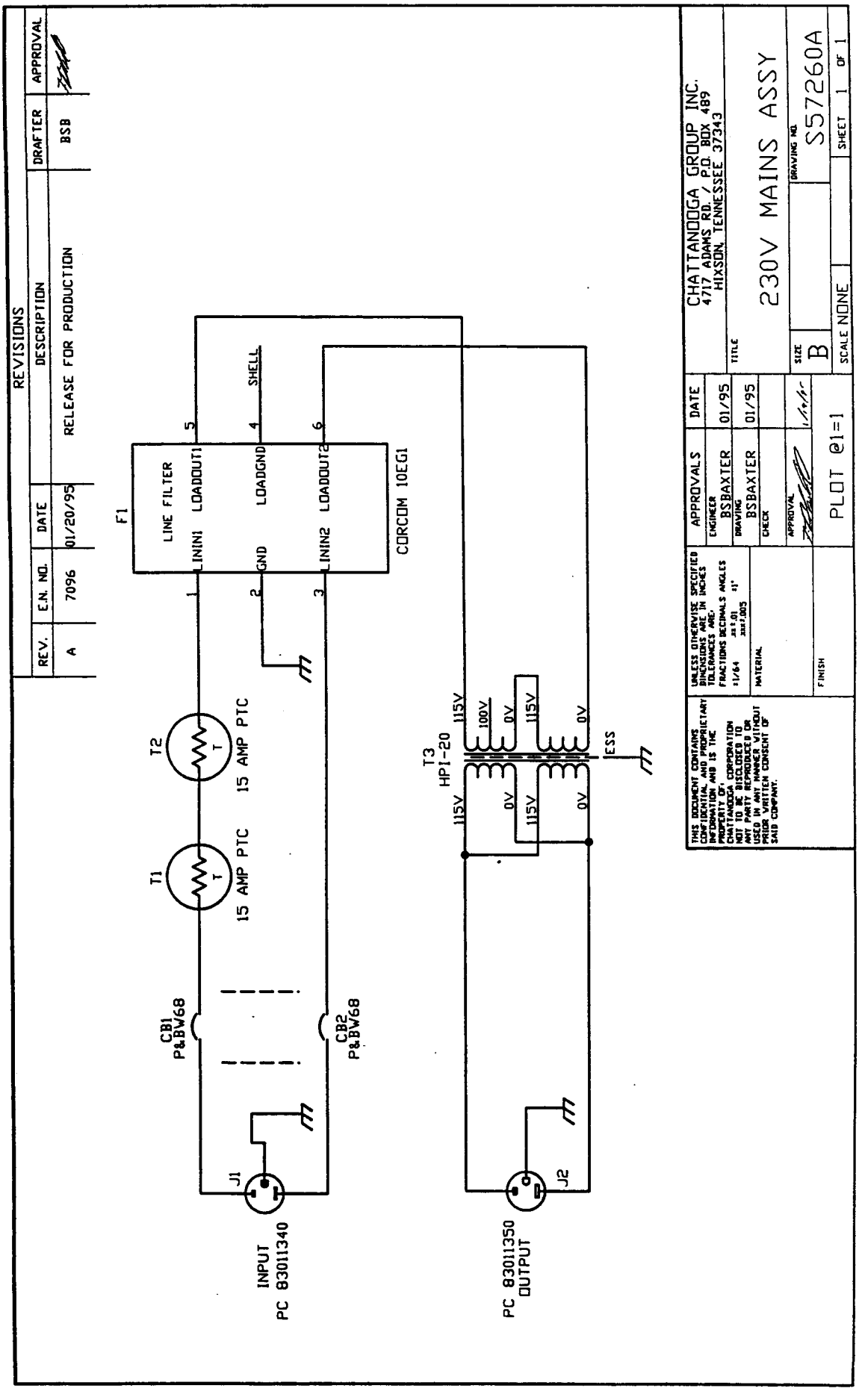
MP 115V Transformer – 57453

QNTY	SIZE	COLOR	LENGTH	OPERATION
2	14 AWG	BRN	3.75	STRIP BOTH ENDS
1	14 AWG	BRN	4.75"	STRIP AND TERM (75396)
1	14 AWG	BRN	5.50"	TERM BOTH ENDS (75396)
1	14 AWG	BRN	6.00"	STRIP AND TERM (75396
1	14 AWG	BRN	6.25"	STRIP BOTH ENDS
2	14 AWG	BLU	3.75"	STRIP BOTH ENDS
1	14 AWG	BLU	4.00"	STRIP AND TERM (75396)
1	14 AWG	BLU	5.50"	TERM BOTH ENDS (75396)
1	14 AWG	BLU	6.00"	STRIP AND TERM (75396)
1	14 AWG	BLU	7.50"	STRIP BOTH ENDS
1	14 AWG	GRN/YEL	4.50"	STRIP AND TERM (75396)
1	14 AWG	GRN/YEL	6.00"	TERM BOTH ENDS (75396 & 60121)
1	14 AWG	GRN/YEL	6.50"	STRIP AND TERM (60121)
				75396 = FASTON, .250, 16-14, 3-52046
				60121 = RING TERM, .250, 16-14, STD 31904

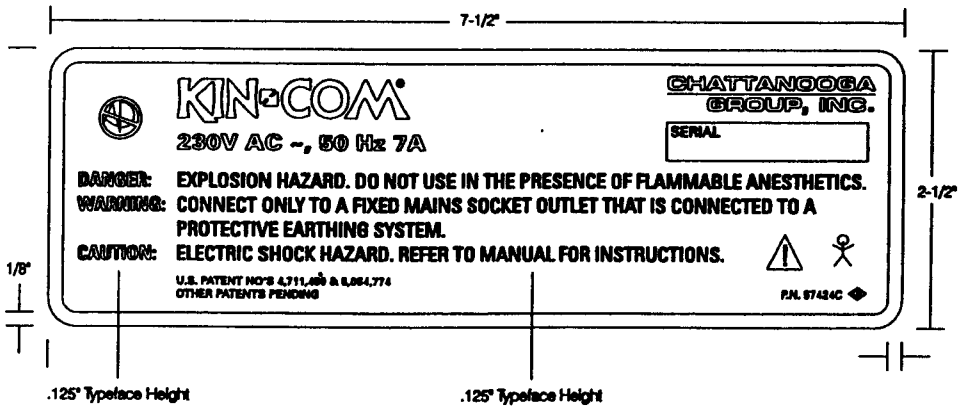
230V Mains Diagram – 57405



230V Mains Assembly – 57260



REVISIONS					
REV.	EN. No.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7096	01-20-95	Release for Production	BSB	
B	7397	02-15-95	Change Typestyle, Label Material and Adhesive		
C	7403	02-22-95	Remove "MP"		



NOTES

1. Material: MKS20 (2 mil)
2. Adhesive: UL Recognized Backing V-23
3. Black Ink Secoil Plas-Cal
4. Clear Laminated Fasson-Supercold Seal (1 mil)
5. All Lettering Vectored
6. All Corners to have .250" Radius
7. UL Recognized Marking and Labeling System
8. Tolerances: Fractions ±1/16, Decimals .XXX ±.015
9. Serial No.'s Per PO

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Unless otherwise specified, dimensions are in inches and tolerances are:
FRACT. ±1/64 DEC. .XX ±.01 .XXX ±.005 ANGLES ±1°

APPROVALS	DATE
ENGINEER BSBaxter	12-12-94
DRAWING G L Monks	02-22-95
CHECK	
APPROVAL	2/23/95

MATERIAL: MKS20 (2 mil) Adhesive V-23 Black Ink

FINISH:

CHATTANOOGA GROUP, INC.
4717 ADAMS ROAD
P.O. BOX 488
HIXSON, TN 37343-0488

TITLE: Decal KINCOM Ser. 230V

SIZE	SCALE	PLOT	SHEET	PART No.	REV
B	1 = 1	@1 = 1	1 of 1	57424	C

230V Serial Decal – 57424

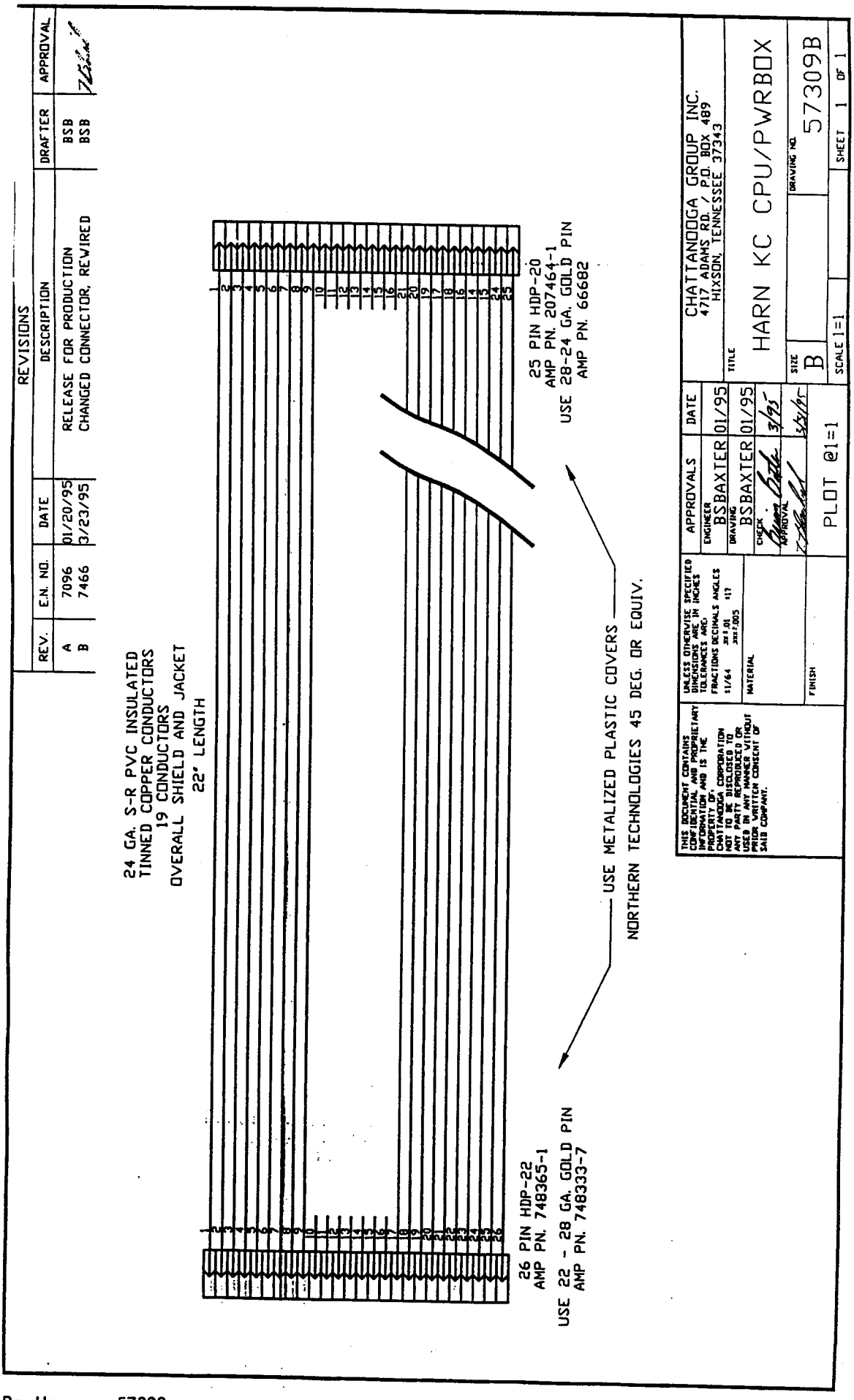
230V Mains Box Bill of Materials for 57260

QNTY	PART No.	DESCRIPTION	NOTES
1	57249	Sheetmetal Base, Painted	
1	57250	Sheetmetal Cover, Painted	
1	53906	Transformer, Signal HPI-20	
1	57251	Receptacle, PC 83011350	
1	57252	Receptacle, PC 83011340	
1	57539	Circuit Breaker, P&B	
1	57254	Terminal Block, 4 Pos	
2	73168	Washers #8 Flat Plated	
2	21808	Screw #8 x 1" Trusshead	
4	60016	Screw .25" - 20 x .75"	
4	21387	Washer .25" Flat	
4	70208	Nut .25" - 20 ESNA	
1.5	74371	Spiral Wrap, Panduit	
2	60415	Nut .25" - 20 Keeper	
12	71592	Screw #6 x 3/8" Self Tap	
3	75385	Terminal .25" Ring #14	
15	74099	Terminal .25" Faston Blue	
4	20029	Screw 4-40 x 3/8" Flathead	
4	70628	Nut 4-40 ESNA	
4	21021	Screw 6-32 x 3/16" Pn Hd	
1	57255	Decal 115V Serial No	
1	57452	Kit 230V	
4	71314	Screw 6-32 x 1/2" Turss Phil SS	
4	75538	Foot Rubber W/Washer	
2	60419	Washer .25" Int Star	
2	53929	Thermistor PTC 15 Amp	
1	57256	Line Filter, Corcom 10EG1	
2	60075	Tyrap, Small Dennison	

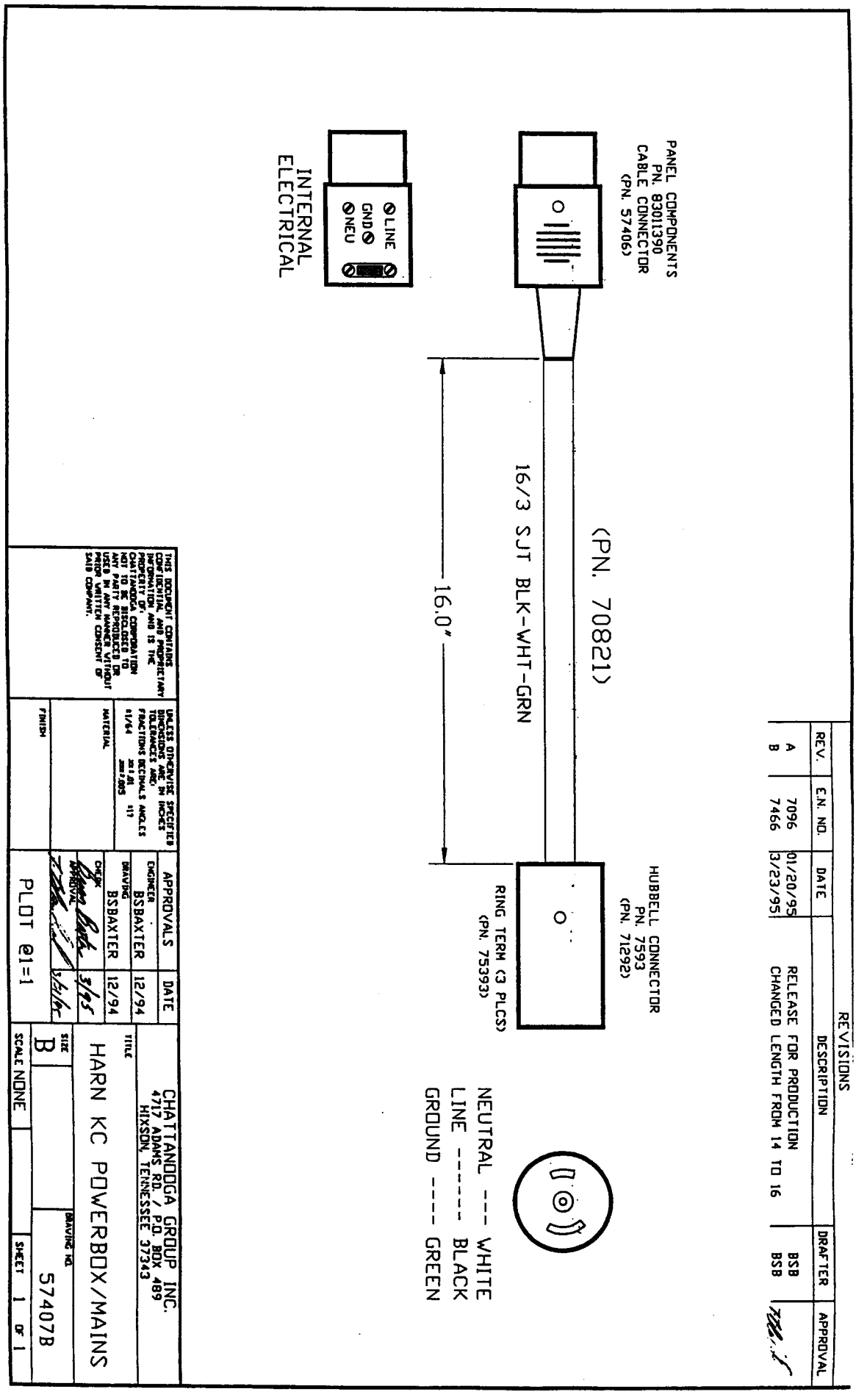
MP 115V Transformer – 57453

QNTY	SIZE	COLOR	LENGTH	OPERATION
1	14 AWG	BRN	3.75	STRIP BOTH ENDS
1	14 AWG	BRN	4.75"	STRIP AND TERM (75396)
1	14 AWG	BRN	5.50"	TERM BOTH ENDS (75396)
1	14 AWG	BRN	6.00"	STRIP AND TERM (75396)
1	14 AWG	BRN	9.50"	STRIP AND TERM (75396)
1	14 AWG	BRN	13.50"	STRIP AND TERM (75396)
1	14 AWG	BLU	3.75"	STRIP BOTH ENDS
1	14 AWG	BLU	4.00"	STRIP AND TERM (75396)
1	14 AWG	BLU	5.50"	TERM BOTH ENDS (75396)
1	14 AWG	BLU	6.00"	STRIP AND TERM (75396)
1	14 AWG	BLU	10.00"	STRIP AND TERM (75396)
1	14 AWG	BLU	14.00"	STRIP AND TERM (75396)
1	14 AWG	GRN/YEL	3.50"	TERM BOTH ENDS (75396 & 60121)
1	14 AWG	GRN/YEL	4.50"	STRIP AND TERM (75396)
1	14 AWG	GRN/YEL	6.00"	TERM BOTH ENDS (75396 & 60121)
1	14 AWG	GRN/YEL	6.50"	STRIP AND TERM (60121)
1	14 AWG	WHT	3.00"	STRIP BOTH ENDS
				75396 = FASTON, .250, 16-14, 3-52046
				60121 = RING TERM, .250, 16-14, STD 31904

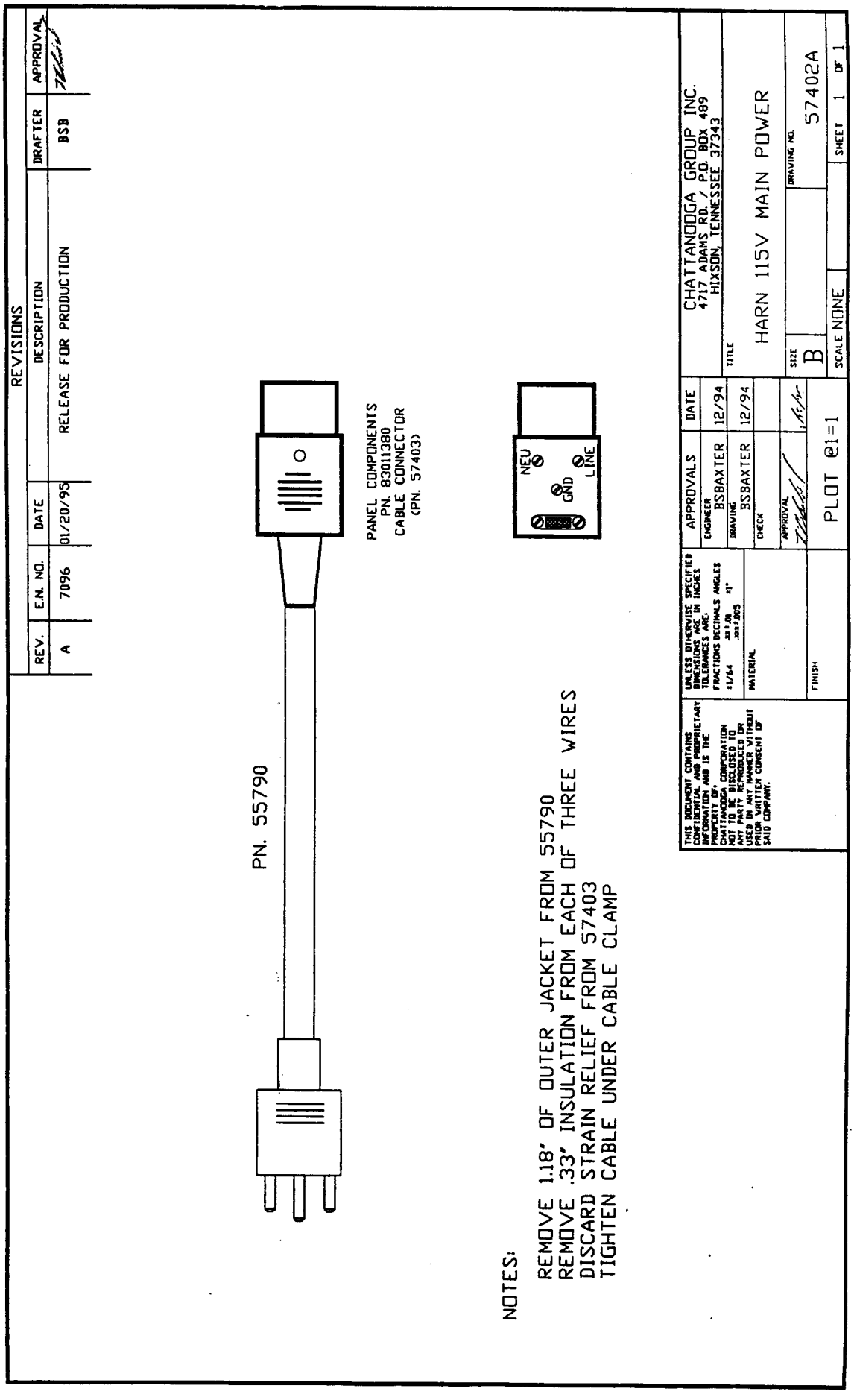
CPU/Power Box Harness – 57309



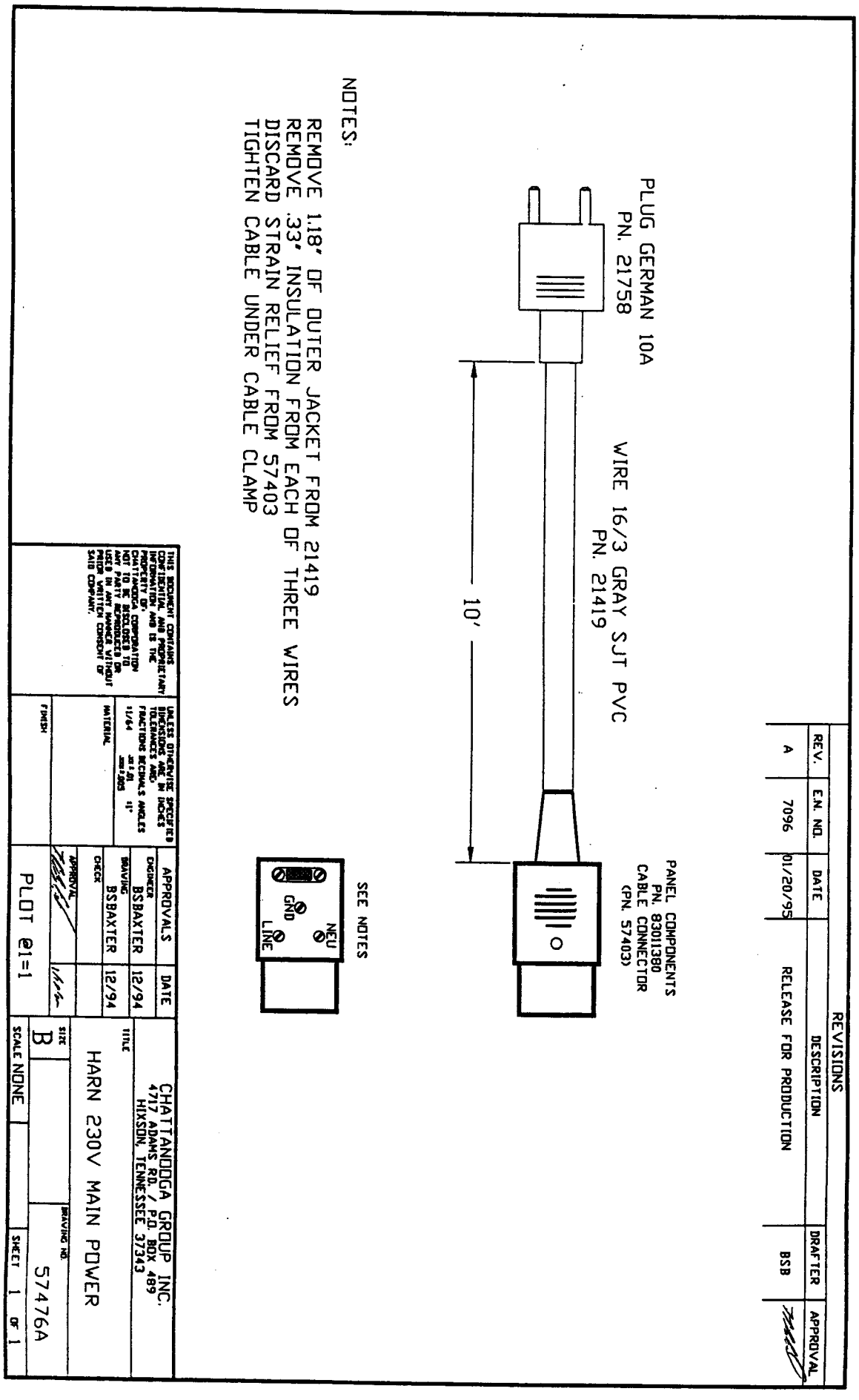
Power Box/Mains Harness – 57407

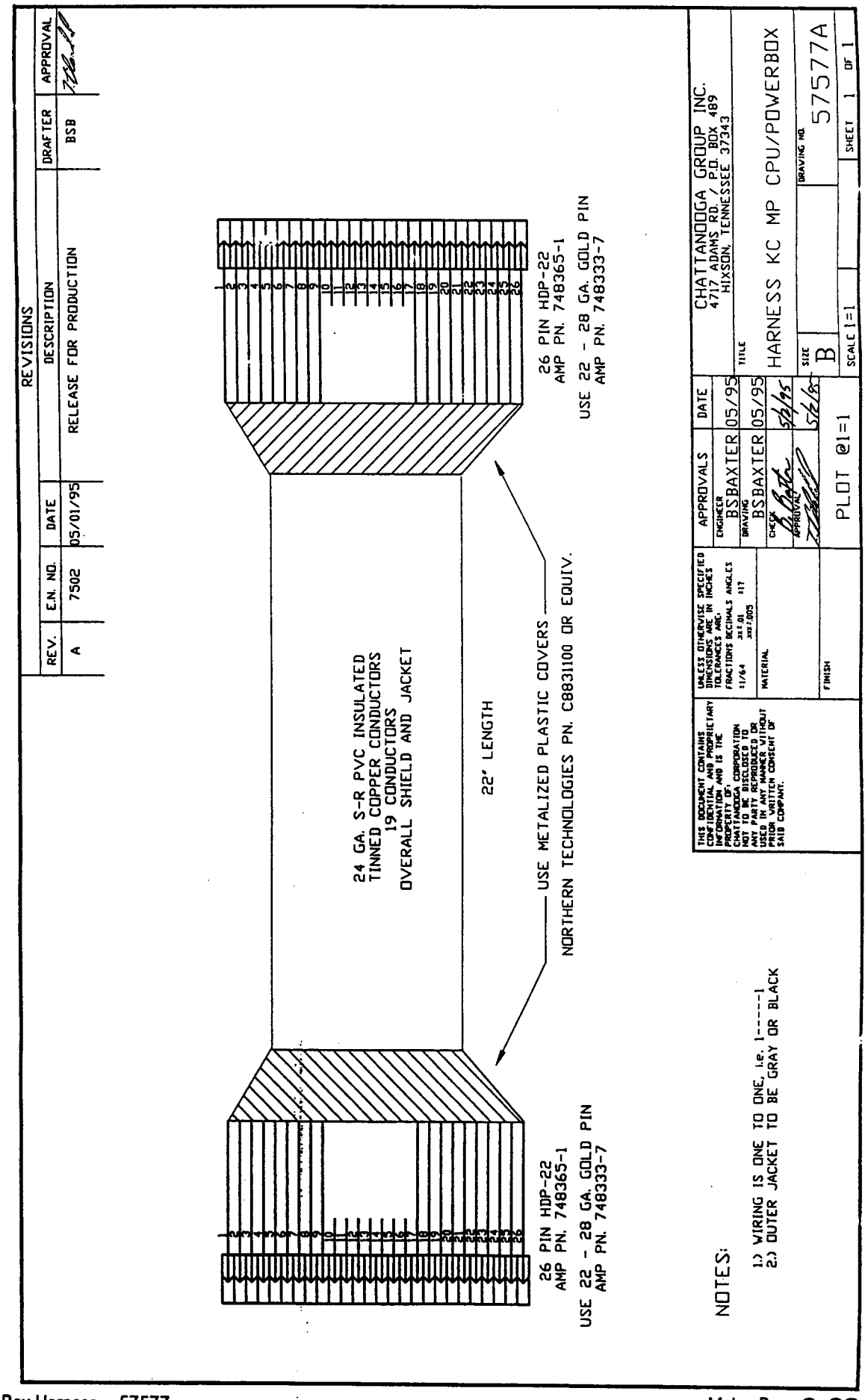


115V Main Power Harness – 57402



230V Main Power Harness – 57476



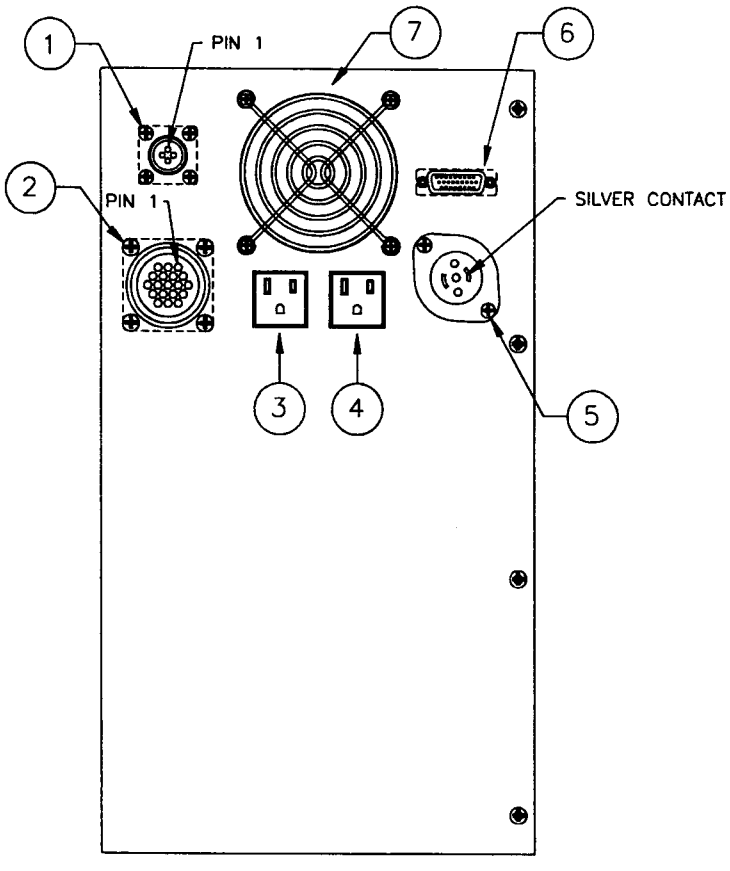

REVISIONS
REV. | E.N. NO. | DATE | DESCRIPTION | DRAFTER | APPROVAL
A | 7502 | 05/01/95 | RELEASE FOR PRODUCTION | BSB
26 PIN HDP-22
AMP PN. 748365-1
USE 22 - 28 GA. GOLD PIN
AMP PN. 748333-7
24 GA. S-R PVC INSULATED
TINNED COPPER CONDUCTORS
19 CONDUCTORS
OVERALL SHIELD AND JACKET
22' LENGTH
USE METALIZED PLASTIC COVERS
NORTHERN TECHNOLOGIES PN. C8831100 OR EQUIV.
26 PIN HDP-22
AMP PN. 748365-1
USE 22 - 28 GA. GOLD PIN
AMP PN. 748333-7
NOTES:
1.) WIRING IS ONE TO ONE, i.e. 1----1
2.) OUTER JACKET TO BE GRAY OR BLACK
THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION AND IS THE PROPERTY OF CHATTANOOGA CORPORATION NOT TO BE DISCLOSED TO ANY PARTY REPRODUCED OR USED IN ANY MANNER WITHOUT PRIOR WRITTEN CONSENT OF SAID COMPANY.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 .XX ±.01 .XXX ±.005 ±1°
MATERIAL
FINISH
APPROVALS | DATE
ENGINEER BSBAXTER 05/95
DRAWING BSBAXTER 05/95
CHECK
APPROVAL
PLOT @1=1
CHATTANOOGA GROUP INC.
4717 ADAMS RD. / P.O. BOX 489
HIXSON, TENNESSEE 37343
TITLE
HARNESS KC MP CPU/POWERBOX
SIZE B
DRAWING NO. 57577A
SCALE 1=1
SHEET 1 OF 1

SECTION 7

Powerbox Drawing

Powerbox Connections

REAR VIEW OF CHASSIS SHOWING CONNECTOR/HARDWARE LOCATIONS



ITEM	QTY	DESCRIPTION
1	1	MONITOR POWER 115V AC, .75 AMP
2	1	HEAD MOTOR, MAGNETICS POWER, 115V AC
3	1	PRINTER POWER, 115V AC, 1 AMP
4	1	COMPUTER POWER, 115V AC, 1 AMP
5	1	CPU LOGIC CONTROL LINES
6	1	LINE POWER, 15A, 115V AC
7	1	FAN, 35 CFM

SECTION

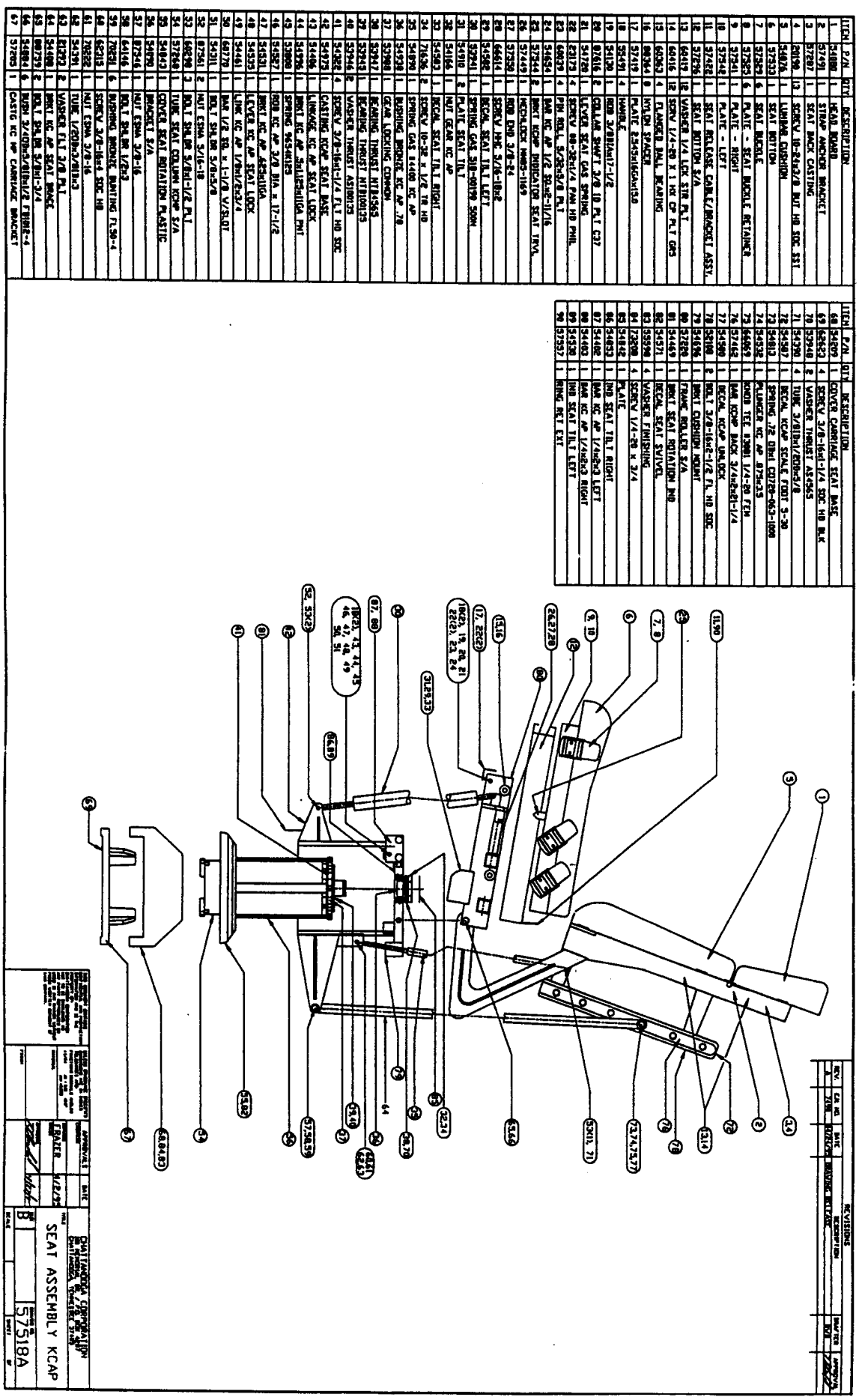
8

Parts Information

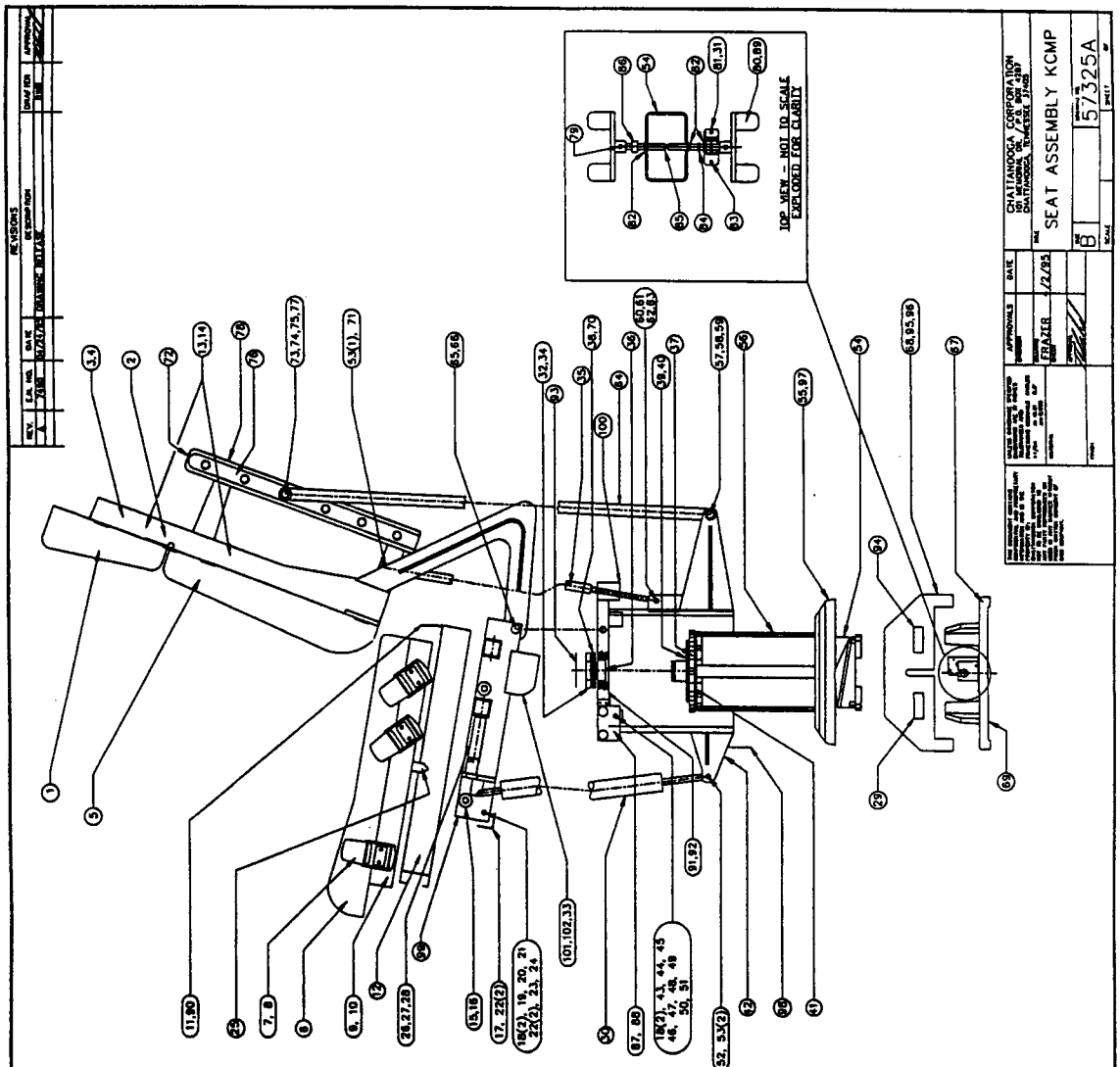
AP Seat Assembly – 57518

ITEM	P/N	QTY	DESCRIPTION
1	54080	1	HEAD BOARD
2	57491	1	STRAP ANCHOR BRACKET
3	57287	1	SEAT BACK CASTING
4	20139	10	SCREW, 10-24x3/8 BUT HD SOC SST
5	54076	1	LUMBAR CUSHION
6	57333	1	SEAT BOTTOM
7	57382	1	SEAT BUCKLE
8	57382	1	PLATE - SEAT BUCKLE RETAINER
9	57341	1	PLATE - RIGHT
10	57342	1	PLATE - LEFT
11	57488	1	SEAT RELEASE CABLE/BRACKET ASSY.
12	57276	1	SEAT BOTTOM S/A
13	66413	12	WASHER 1/4 LCK STR PLT
14	66416	12	SCRV 1/4-20 X 1 HX CP PLT GR5
15	66062	4	FLANGED BALL BEARING
16	66364	8	NYLON SPACER
17	57419	1	PLATE 2345x166Gax150
18	52419	4	HANDLE
19	54128	1	ROD 3/8Dx617-1/2
20	57616	2	COLLAR SHFT 3/8 ID PLT G37
21	54720	1	LEVER SEAT GAS SPRING
22	63173	4	SCREW #8-32x1/4 PAN HD PHIL
23	66029	4	PIN ROLL 5/32x5/8 PLT
24	54454	1	BAR KC AP 1/2 SQ-12-11/16
25	57344	2	BRKT KCAP INDICATOR SEAT TRVL
26	57449	1	MECH-LOCK HW#3-1169
27	57350	1	ROD END 3/8-24
28	66614	1	SCREW, HSC 5/16-18x2
29	54598	1	BRCKT, SEAT TILT LEFT
30	57341	1	SPRING GAS 310-00199 500N
31	54916	2	PLATE, SEAT TILT
32	54166	1	UNIT GEAR KC AP
33	54593	1	BRCKT, SEAT TILT RIGHT
34	71636	2	SCREW HC-32 x 1/2 TR HD
35	54598	1	SPRING GAS 8440 KC AP
36	54538	1	BUSHING BRONZE KC AP .78
37	52798	1	GEAR LOCKING COMMON
38	52847	1	BEARING THRUST NTB1625
39	53843	1	BEARING THRUST NTB1013
40	53944	2	WASHER THRUST AS10013
41	54382	4	SCREW 3/8-16x1-1/4 FLT HD SOC
42	54972	1	CASTING KCAP SEAT BASE
43	54496	1	LINKAGE KC AP SEAT LOCK
44	54596	1	BRKT KC AP SeatLatch PNT
45	53909	1	SPRING 9454125
46	54382	1	ROD KC AP 3/8 DIA x 17-1/2
47	54583	1	BRKT KC AP ASSmbly
48	54535	1	LEVER KC AP SEAT LOCK
49	54461	1	LINK KC AP 1/8x1/2x3/4
50	66778	1	BAR 1/2 SQ x 1-1/8 W/SLOT
51	54311	1	BOLT SHLDR 5/8x5/8
52	87561	2	NUT ESNA 5/16-18
53	66698	2	BOLT SHLDR 5/8x1-1/2 PLT
54	57849	1	TUBE SEAT COLUMN KCAP S/A
55	54043	1	COVER SEAT ROTATION PLASTIC
56	54098	1	BRACKET S/A
57	87244	1	NUT ESNA 3/8-16
58	64146	1	BOLT SHLDR 1/2in2
59	70631	6	BUSHING BRONZE MARTINE FL50-4
60	66315	1	SCREW 3/8-16x4 SOC HD
61	70322	1	NUT ESNA 3/8-16
62	54301	1	TUBE L=600x3/8IDx3
63	01292	2	WASHER FLT 3/8 PLT
64	54480	1	BRKT KC AP SEAT BRACE
65	00759	2	BOLT SHLDR 5/8dx1-3/4
66	54804	6	BURN 2/40Dx5/8IDx1/2 FIBRE-4
67	57283	1	CASTG KC HP CARRIAGE BRACKET

ITEM	P/N	QTY	DESCRIPTION
68	54209	1	COVER CARRIAGE SEAT BASE
69	65652	4	SCREW 3/8-16x1-1/4 SOC HD BLK
70	52948	8	WASHER THRUST AS4965
71	54390	4	TUBE 3/8IDx1/2ODx5/8
72	54587	1	DECAL KCAP SCALE FOOT 5-30
73	54813	1	SPRING .72 IDx1 C0720-063-1000
74	54532	1	PLUNGER KC AP 875x35
75	66862	1	KNOB TEE #3001 1/4-20 FEM
76	57468	1	BAR KCHP BACK 3/4x24x1-1/4
77	54580	1	DECAL KCAP UNLOCK
78	35100	2	BOLT 3/8-16x2-1/2 FL HD SOC
79	54696	1	BRKT CUSHION MOUNT
80	57280	1	FRAME ROLLER S/A
81	54481	1	BRKT SEAT ROTATION IND
82	54571	1	DECAL SEAT SWIVEL
83	35598	4	WASHER FINISHING
84	73230	4	SCREW 1/4-20 x 3/4
85	54842	1	PLATE
86	54453	1	BRKT SEAT TILT RIGHT
87	54482	1	BAR KC AP 1/4x8x3 LEFT
88	54483	1	BAR KC AP 1/4x8x3 RIGHT
89	54530	1	BRKT SEAT TILT LEFT
90	57557	1	RING RET EXT

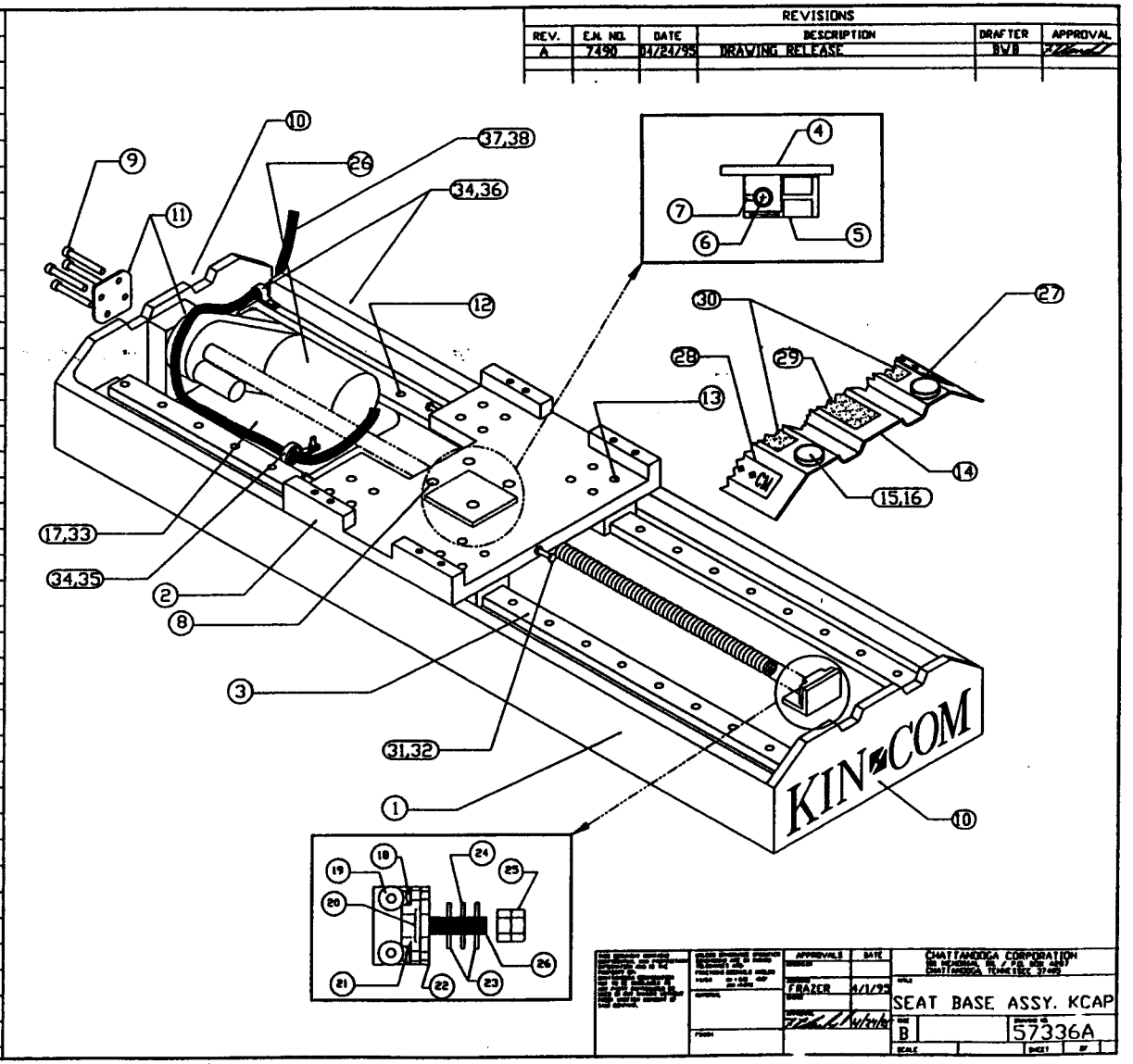


MP Seat Assembly – 57325

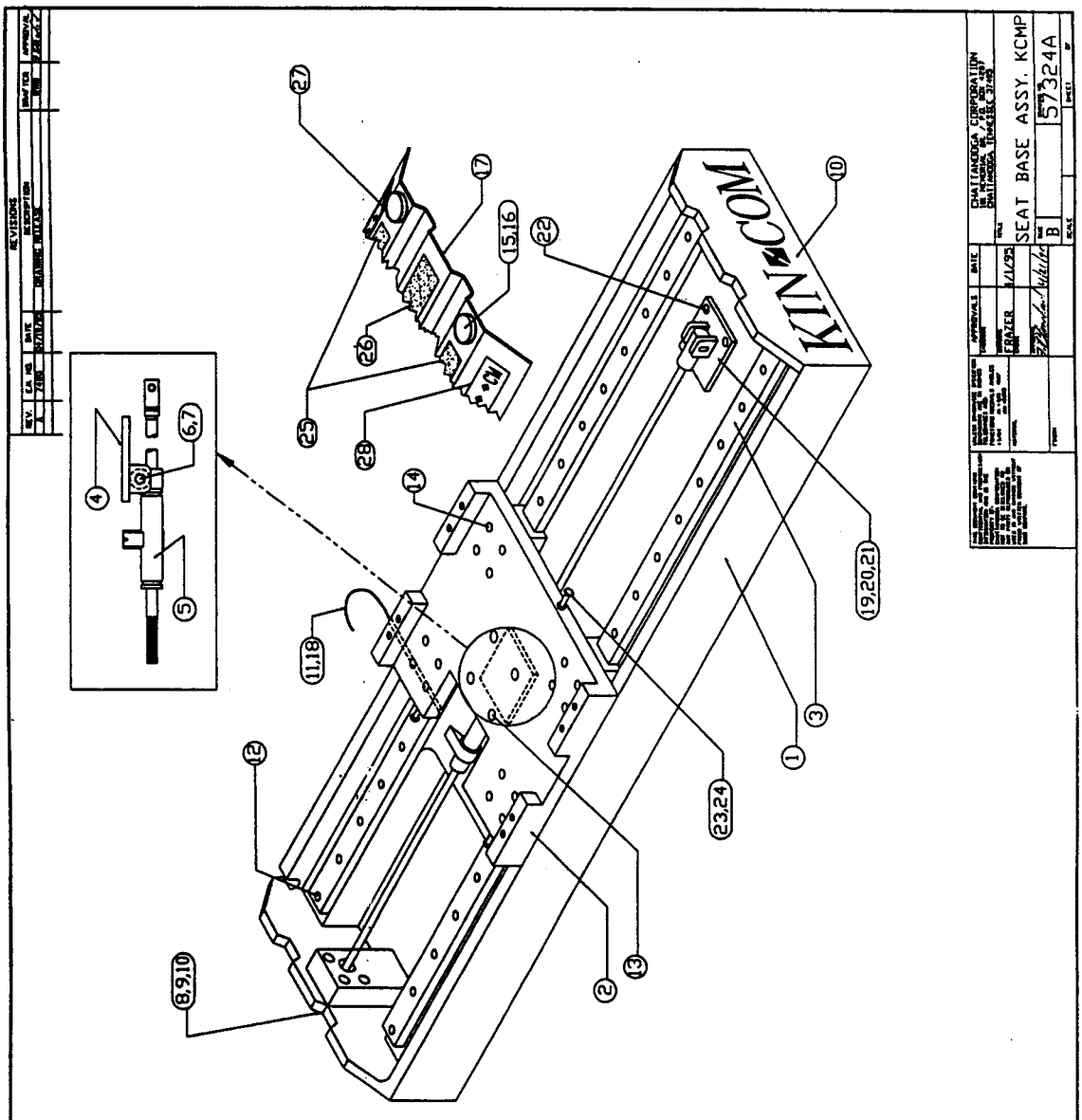


ITEM	P/N	QTY	DESCRIPTION
1	34080	1	HEAD BOARD
2	57401	1	STRAP ANCHOR BRACKET
3	57287	1	SEAT BACK CASTING
4	20190	12	SCREW,10-24x3/8 BUT HD SOC SST
5	34078	1	LUMBAR CUSHION
6	37533	1	SEAT BOTTOM
7	37538	8	SEAT BUCKLE
8	37539	8	PLATE - SEAT BUCKLE RETAINER
9	37541	1	PLATE - RIGHT
10	37542	1	PLATE - LEFT
11	31424	1	SEAT RELEASE CABLE/BRACKET ASSY.
12	37288	1	SEAT BOTTOM S/A
13	60418	12	WASHER 1/4 LOK STR PLT
14	60418	12	SCREW 1/4-20 X 1 HX CP PLT GR5
15	60383	4	FLANGED BALL BEARING
16	60384	8	NYLON SPACER
17	57419	1	PLATE 2.45x16GAx19.0
18	35481	4	HANDLE
19	34130	1	ROD 3/8Dx417-1/2
20	87818	2	COLLAR SHAFT 3/8 ID PLT G37
21	34720	1	LEVER SEAT GAS SPRING
22	23175	4	SCREW #8-32x1/4 PAN HD PHIL
23	60038	4	PIN ROLL 3/32x5/8 PLT
24	34694	1	BAR KC AP 1/2 Rx2-11/16
25	37544	2	BRKT KCMP INDICATOR SEAT TRVL
26	37448	1	MECHLOCK MM85-1169
27	37550	1	ROD END 3/8-24
28	60814	1	SCREW HHC 3/8-16x2
29	37416	2	DECAL FOOT PEDAL LOCKED
30	33541	1	SPRING GAS 518-20190 SOEM
31	37552	1	SPRING TORSION
32	34196	1	NUT GEAR KC AP
33	34593	1	DECAL SEAT TILT RIGHT
34	71636	2	SCREW 10-32 x 1/2 TR HD
35	34890	1	SPRING GAS #4400 KC AP
36	34938	1	BUSHING BRONZE KC AP .78
37	33888	1	GEAR LOCKING COMMON
38	33947	1	BEARING THRUST NTB1625
39	33845	1	BEARING THRUST NTB1001.25
40	33846	2	WASHER THRUST AS100125
41	34322	4	SCREW 3/8-16x1-1/4 FLT HD SOC
42	34972	1	CASTING KCMP SEAT BASE
43	34400	1	LINKAGE KC AP SEAT LOCK
44	34098	1	BRKT KC AP .5x1.125x11GA PNT
45	33858	1	SPRING WE54X125
46	34527	1	ROD KC AP 3/8 DIA x 17-1/2
47	34531	1	BRKT KC AP .625x11GA
48	34533	1	LEVER KC AP SEAT LOCK
49	34491	1	LINK KC AP 1/8x1/2x3/4
50	60770	1	BAR,1/2 SQ. x 1-1/8 W/2SLOT
51	34311	1	BOLT SHLDR 5/8x5/8
52	87561	2	NUT CSNA 5/16-18
53	60288	3	BOLT SHLDR 5/8x1-1/2 PLT
54	37288	1	TUBE SEAT COLUMN KCMP S/A
55	34843	1	COVER SEAT ROTATION PLASTIC
56	34080	1	BRACKET S/A
57	87546	1	NUT CSNA 3/8-16
58	84116	1	BOLT SHLDR 1/2x3
59	70231	8	BUSHING BRONZE BUNTING FL50-4
60	82315	1	SCREW 3/8-16x1 SOC HD
61	70232	1	NUT ESNA 3/8-16
62	34381	1	TUBE 1/2ODx1/8Dx3
63	21393	2	WASHER FLT 3/8 PLT
64	34498	1	BRKT KC AP SEAT BRACE
65	60759	2	BOLT SHLDR 5/8x1-3/4
66	34984	8	BUSH 3/400x5/8Dx1/2 FB1012-4
67	37205	1	CASTG KC MP CARRIAGE BRACKET
68	37455	1	COVER KCMP CARRIAGE SEAT BASE
69	82823	4	SCREW 3/8-16x1-1/4 SOC HD BLK
70	33948	2	WASHER THRUST AS1585
71	34390	4	TUBE 3/8Dx1/20Dx5/8
72	34587	1	DECAL KCAP SCALE FOOT 3-30
73	34812	1	SPRING .72 ODx1.00720-043-1000
74	34933	1	PLUNGER KC AP .875x3.5
75	60083	1	KNOB TEE #3081 1/4-20 FEM
76	37492	1	BAR KCMP BACK 3/4x2x21-1/4
77	34580	1	DECAL KCAP UNLOCK
78	32108	2	BOLT 3/8-16x2-1/2 FL HD SOC
79	60092	2	SPLIT PIN - 3/16 X 1
80	37371	2	FOOT PEDAL
81	37359	1	LOCK KCMP FOOT MECH S/A
82	81838	3	BUSHING
83	82044	2	SCREW 1/4-20 x 5/8
84	50680	1	E-RING
85	57387	1	SHAFT
86	84114	1	SHAFT COLLAR
87	34402	1	BAR KC AP 1/4x2x3 LEFT
88	34403	1	BAR KC AP 1/4x2x3 RIGHT
89	37543	4	SAFETY WALK PAD
90	37397	1	RING RET EXT
91	34530	1	HD SEAT TILT LEFT
92	34893	1	HD SEAT TILT RIGHT
93	34842	1	PLATE
94	37417	2	DECAL FOOT PEDAL UNLOCKED
95	73208	4	SCREW 1/4-20 x 3/4
96	35598	4	WASHER FINISHING
97	34571	1	DECAL SEAT SWIVEL
98	34488	1	BRKT SEAT ROTATION IND
99	37220	1	FRAME ROLLER S/A
100	34698	1	BRKT CUSHION MOUNT
101	34910	2	PLATE SEAT TILT
102	34582	1	DECAL SEAT TILT LEFT

ITEM	P/N	QTY	DESCRIPTION
1	57203	1	BASE CASTING
2	57494	1	CARRIAGE CASTING
3	53905	2	LINEAR BEARING ASSEMBLY
4	57379	1	NUT BRACKET
5	54211	1	BALL SCREW NUT
6	54214	2	PIVOT PIN
7	54749	2	SOC SET SCREW #8-32X3/8
8	61684	4	SHCS 1/4-28 X 1/2
9	52277	4	SHCS 1/4-20X2-1/4
10	57418	2	DECAL END CASTING
11	54693	2	MOTOR PLATE
12	54314	42	SHCS M6-1 X 20MM
13	54312	16	SHCS M6-1 X 16MM
14	54631	1	BASE COVER
15	73208	4	FHSCS 1/4-20 X 3/4
16	55598	4	NYLON WASHER
17	54250	1	COVER MOTOR
18	62951	2	BHSCS 1/4X2-1/4
19	63484	2	BHSCS 3/8-16 X 1
20	70251	1	BUSHING, BRONZE BUNTING FL50-4
21	54215	1	BUSHING PLATE KC AP
22	54210	1	ANGLE BRACKET KC AP
23	54616	2	WASHER TRB-815 .060 THK.
24	54617	1	THRUST BEARING TORRINGTON NTA-816
25	61602	2	HEX JAM NUT 1/2-20
26	54158	1	ACTUATOR FASCO 39"
27	54569	1	DECAL SEAT SECTION LEFT
28	54570	1	DECAL SEAT SECTION RIGHT
29	52295	5'	SAFETY WALK 2"
30	52294	10'	SAFETY WALK 1"
31	62983	3	NUT 1/4-20
32	60416	3	SCREW 1/4-20 x 1
33	20190	4	SCREW 10-24 x 3/8
34	57556	4	CLAMP CABLE
35	21733	1	NUT 8-32 ESNA
36	53232	3	SCREW 1/4-20 x 1/2
37	57554	1	HARNESS POWER EXTENSION
38	57555	1	HARNESS SIGNAL EXTENSION



MP Seat Base Assembly – 57324



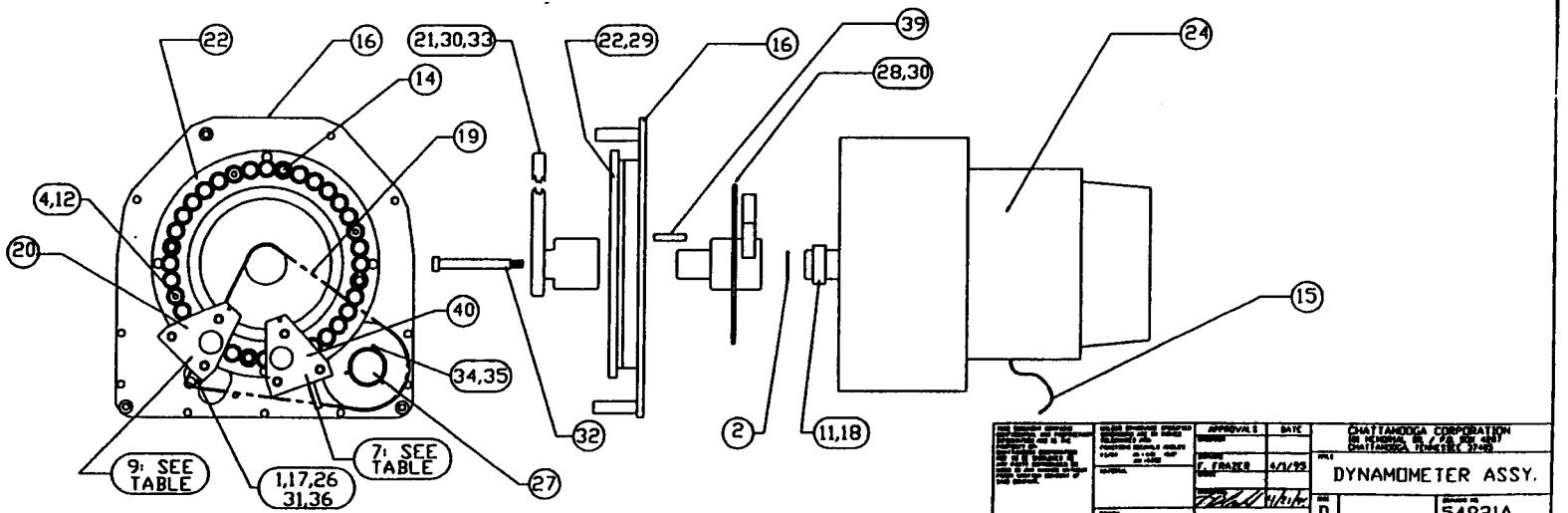
ITEM	P/N	QTY	DESCRIPTION
1	57203	1	BASE CASTING
2	57494	1	CARRIAGE CASTING
3	53905	2	LINEAR BEARING ASSEMBLY
4	57378	1	CLEVIS
5	57447	1	MECH. LOCK
6	66224	1	BOLT 5/16-18 x 2-1/2 HEX HEAD
7	87561	1	ESNA NUT 5/16-18
8	60544	2	3/8-24 JAM NUT (NOT VISIBLE)
9	21393	1	3/8 FW (NOT VISIBLE)
10	57418	2	DECAL END CASTING
11	57443	1	FLEXIBLE CABLE
12	54314	42	SHCS M6-1 X 20MM
13	61684	4	SHCS 1/4-28 X 1/2
14	54312	16	SHCS M6-1 X 16MM
15	73208	4	FHSCS 1/4-20 X 3/4
16	55598	4	NYLON WASHER
17	54631	1	BASE COVER
18	57557	1	RING RETAINER EXT
19	57382	1	BRKT LOCK
20	63724	1	BOLT SHLDR 1/4 x 1-1/4
21	70213	1	ESNA NUT 10-24
22	63484	2	SCREW 3/8-16 X 1
23	62983	3	NUT 1/4-20
24	60416	3	SCREW 1/4-20 x 1
25	52294	10'	SAFETY WALK 1"
26	52295	5'	SAFETY WALK 2"
27	57438	1	DECAL SEAT SECTION LEFT
28	57439	1	DECAL SEAT SECTION RIGHT
29			
30			

ITEM	P/N	QTY	DESCRIPTION	ITEM	P/N	QTY	DESCRIPTION
1	21384	2	WASHER #10 SPECIAL FLAT SS	23	54755	2	SPRING 9434K98 .481X1.5X.038
2	21393	1	WASHER 3/8 FLAT PLATED	24	54828	1	MOTOR PMI KC AP ASSY
3	54074	2	PIN SPLIT 1/8X7/16	25	54851	2	RETAINER KC AP BOT CAR PNT
4	54176	4	PIN KC AP HUB MOUNT	26	55715	1	BRKT KC-E/P IDLER 11GA PNT
5	54179	2	GLIDE KC AP CARR BTM DELRIN	27	55982	1	PULLEY KC POT DRIVE
6	54180	2	GLIDE KC AP CARR TOP DELRIN	28	57499	1	HUB KCAP INNER ASSY PNT
7	54181	1	STOP KC CAR RIGHT ASSEMBLY	29	60188	4	SCREW 3/8-16X3/4 SOC CAP BLKGI
8	54182	2	PIN KC AP CARRIAGE STOP	30	60813	4	SCREW 1/4-20X1/4 SOCK SET BLK
9	54183	1	STOP KC CAR LEFT ASSEMBLY	31	64277	1	BOLT SHLDR 1/4X5/8 BLK
10	54186	2	RETAINER KC AP CARR TOP	32	70248	1	BOLT SHLDR 3/8X2-3/4 SOC HD B
11	54315	4	SCREW 8-32X1/8 SET	33	70687	1	RULER KC
12	54317	4	SCREW 10-24X3/8 FLT HD SOC SS	34	71543	3	SCREW 4-40 X 1/2 PAN HD PHIL
13	54319	6	SCREW 1/4-28X1/2 FLAT HD SOC	35	73025	3	CLAMP KC 409074 REVER SYNCLAM
14	54320	4	SCREW 5/16-18X5/8 SOC CAP-SS	36	85026	2	SCREW 8-32X1/2 BUTTON HD BL
15	54493	1	HARN KC AP POT	37	87548	1	PIN SPLIT 1/4X1-1/4
16	54543	1	MOUNT KC AP MOTOR ASSY	38	87589	2	KNOB #3055B 3/8-16 FEMALE
17	54544	1	PULLEY KC AP IDLER MOD	39	57569	1	KEY 1/4 SQUARE X 1-1/4
18	54545	1	PULLEY KC AP MOTOR SHAFT	40	54585	1	DECAL SAFETY STOP D
19	54563	1	BELT 6B16-290-025	41			
20	54584	1	DECAL KC AP SAFETY STOP C	42			
21	54675	1	HUB KC AP OUTER ASSY PLT	43			
22	54677	1	HUB KC AP STOP PLT	44			

REVISIONS					
REV.	E.N. NO.	DATE	DESCRIPTION	DRAFTER	APPROVAL
A	7480	10/19/95	ORIGINAL RELEASE	[illegible]	[illegible]

SUB-ASSEMBLIES '7' & '9'
P/N'S REQUIRED

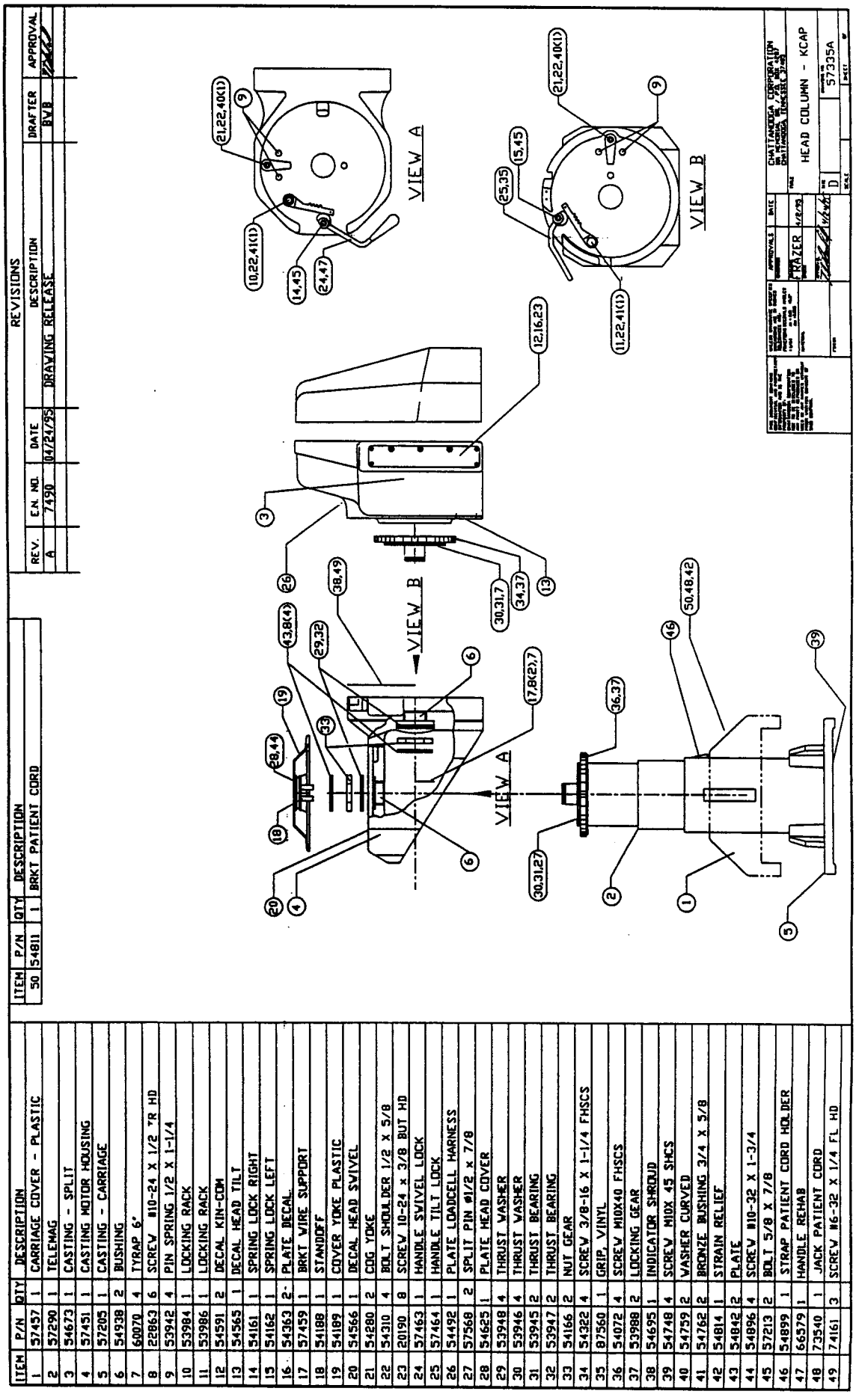
#7	#9
3	3
5	5
6	6
8	8
10	10
13	13
23	23
25	25
37	38
38	



		APPROVALS	DATE
		C. FRAZIER	4/1/95

CHATTANOOGA CORPORATION
DYNAMOMETER ASSY.
SIZE D
54821A
SCALE
SHEET

AP Head Column – 57335

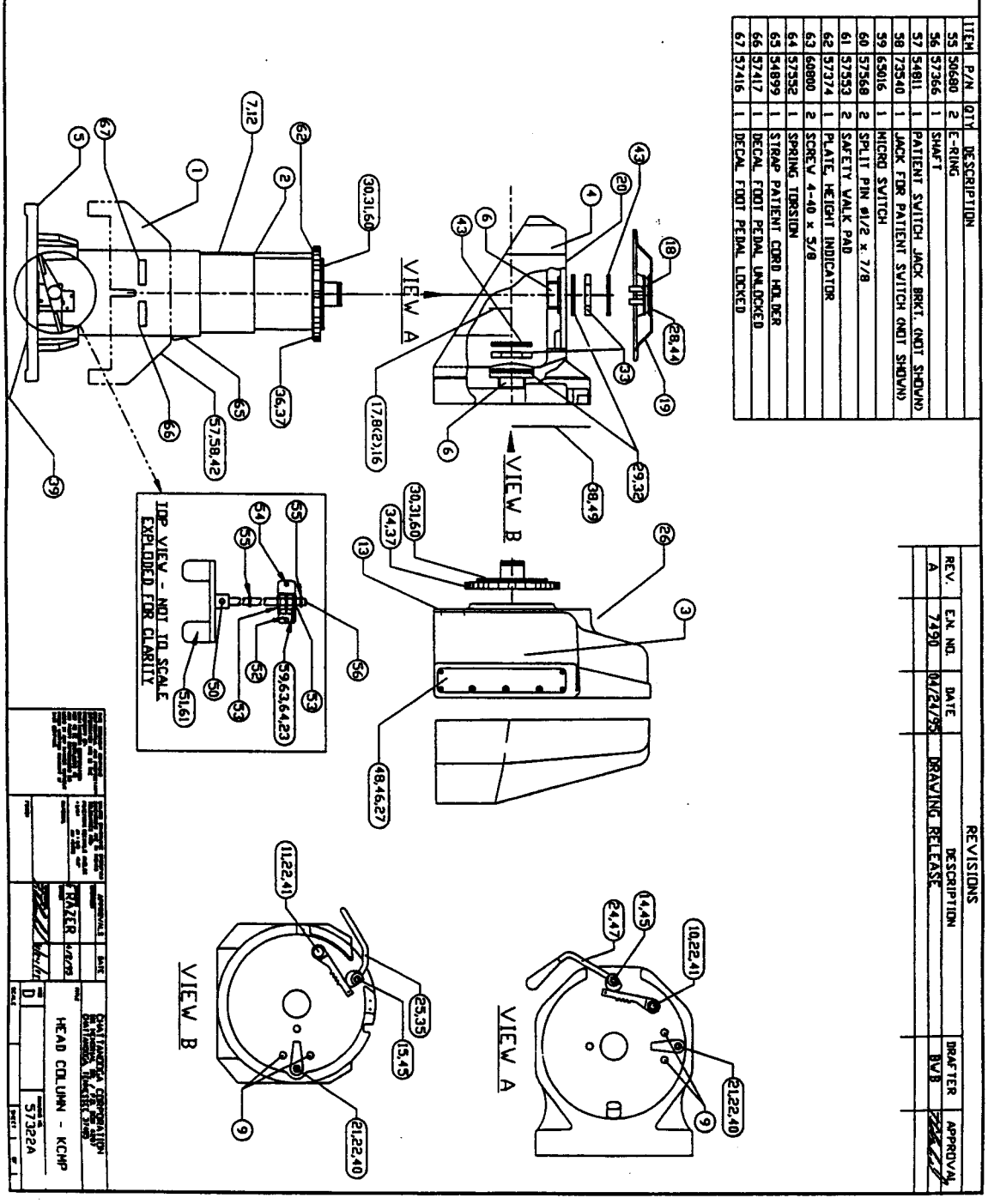


ITEM	P/N	QTY	DESCRIPTION
1	57457	1	CARRIAGE COVER - PLASTIC
2	57290	1	TELEMAG
3	54673	1	CASTING - SPLIT
4	57451	1	CASTING MOTOR HOUSING
5	57205	1	CASTING - CARRIAGE
6	54938	2	BUSHING
7	60070	4	TYRAP 6"
8	22863	6	SCREW #10-24 X 1/2 "R HD
9	53942	4	PIN SPRING 1/2 X 1-1/4
10	53984	1	LOCKING RACK
11	53986	1	LOCKING RACK
12	54591	2	DECAL KIN-COM
13	54565	1	DECAL HEAD TILT
14	54161	1	SPRING LOCK RIGHT
15	54162	1	SPRING LOCK LEFT
16	54363	2	PLATE DECAL
17	57459	1	BRKT WIRE SUPPORT
18	54188	1	STANDOFF
19	54189	1	COVER YOKE PLASTIC
20	54566	1	DECAL HEAD SWIVEL
21	54280	2	COG YOKE
22	54310	4	BOLT SHOULDER 1/2 X 5/8
23	20190	8	SCREW 10-24 x 3/8 BUT HD
24	57463	1	HANDLE SWIVEL LOCK
25	57464	1	HANDLE TILT LOCK
26	54492	1	PLATE LOADCELL HARNESS
27	57568	2	SPLIT PIN ø1/2 x 7/8
28	54625	1	PLATE HEAD COVER
29	53948	4	THRUST WASHER
30	53946	4	THRUST WASHER
31	53945	2	THRUST BEARING
32	53947	2	THRUST BEARING
33	54166	2	NUT GEAR
34	54322	4	SCREW 3/8-16 X 1-1/4 FHSCS
35	87560	1	GRIP, VINYL
36	54072	4	SCREW M10X40 FHSCS
37	53988	2	LOCKING GEAR
38	54695	1	INDICATOR SHROUD
39	54748	4	SCREW M10X 45 SHCS
40	54759	2	WASHER CURVED
41	54762	2	BRONZE BUSHING 3/4 X 5/8
42	54814	1	STRAIN RELIEF
43	54842	2	PLATE
44	54896	4	SCREW #10-32 X 1-3/4
45	57213	2	BOLT 5/8 X 7/8
46	54899	1	STRAP PATIENT CORD HOLDER
47	66579	1	HANDLE REHAB
48	73540	1	JACK PATIENT CORD
49	74161	3	SCREW #6-32 X 1/4 FL HD

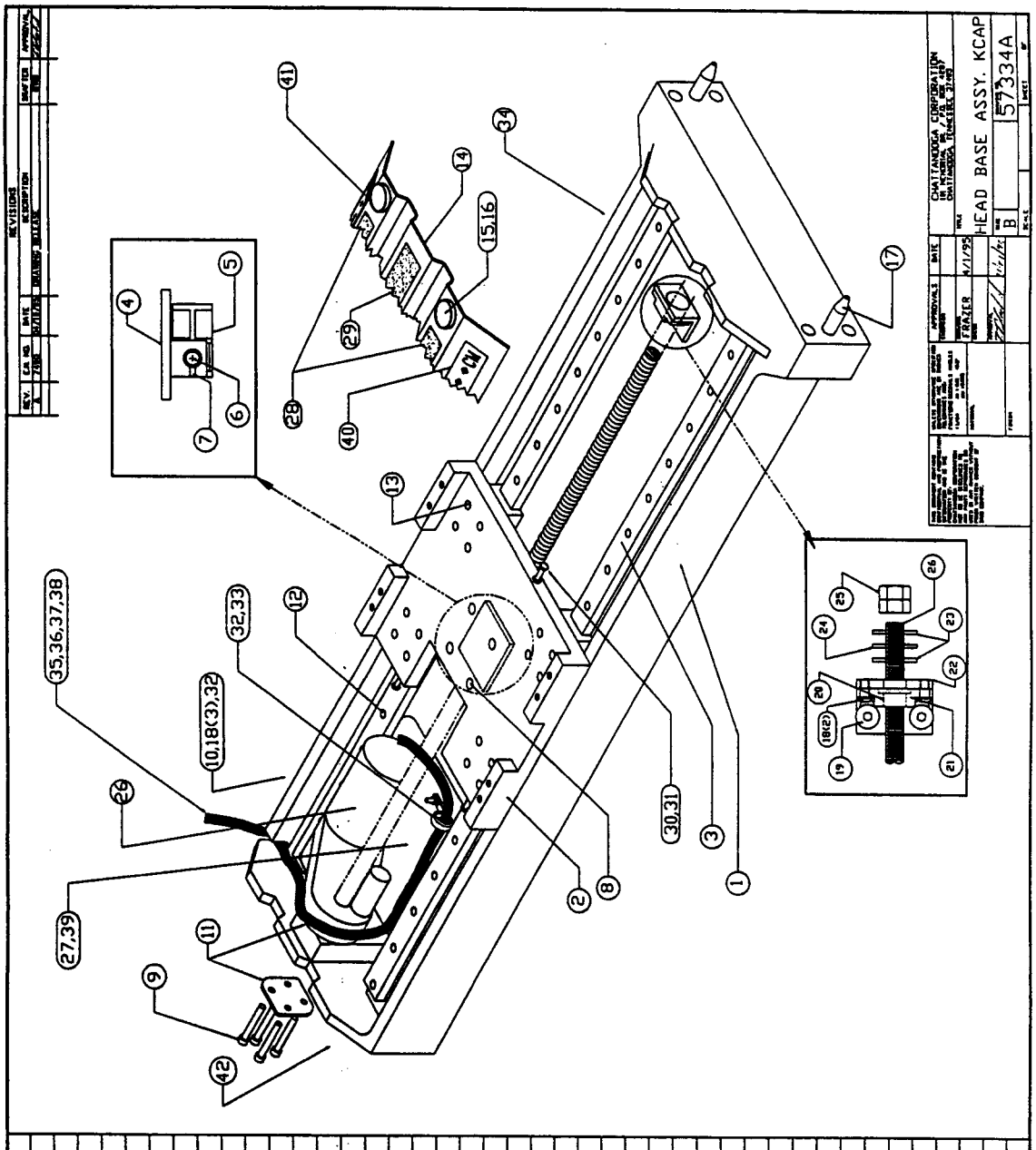
MP Head Column – 57322

ITEM	P/N	QTY	DESCRIPTION
1	57456	1	CARRIAGE COVER - PLASTIC
2	57291	1	TELEMAG
3	54673	1	CASTING - SPLIT
4	57451	1	CASTING - MOTOR HOUSING
5	57205	1	CASTING - CARRIAGE
6	54938	2	BUSHING
7	72204	2	SCREW 4-40 X 1/4
8	22863	6	SCREW #10-24 X 1/2 TR HD
9	53942	4	PIN SPRING 1/2 X 1-1/4
10	53984	1	LOCKING RACK
11	53986	1	LOCKING RACK
12	57375	1	DECAL HEAD UP/DOWN
13	54563	1	DECAL HEAD TILT IND
14	54161	1	SPRING LOCK RIGHT
15	54162	1	SPRING LOCK LEFT
16	60070	4	TYRAP 6"
17	57459	1	BRKT WIRE SUPPORT
18	54188	1	STANDOFF
19	54189	1	COVER YOKE PLASTIC
20	54566	1	DECAL HEAD SWIVEL IND
21	54280	2	COG YOKE
22	54310	4	BOLT SHOULDER 1/2 X 5/8
23	70628	2	NUT 4-40 ESNA
24	57463	1	HANDLE SWIVEL LOCK
25	57464	1	HANDLE TILT LOCK
26	54492	1	PLATE LOADCELL HARNESS
27	20190	8	10-24 x 3/8 BUT HD
28	54623	1	PLATE HEAD COVER
29	53948	4	THRUST WASHER
30	53946	4	THRUST WASHER
31	53945	2	THRUST BEARING
32	53947	2	THRUST BEARING
33	54166	2	NUT GEAR
34	54322	4	SCREW 3/8-16 X 1-1/4 FHSCS
35	87560	1	GRIP VINYL
36	54072	4	SCREW M10X40 FHSCS
37	53988	2	LOCKING GEAR
38	54695	1	INDICATOR SHROUD
39	54748	4	SCREW M10X 45 SHCS
40	54759	2	WASHER CURVED
41	54762	2	BRONZE BUSHING 3/4 X 5/8
42	54814	1	STRAIN RELIEF
43	54842	2	PLATE
44	54896	4	SCREW #10-32 X 1-3/4
45	57213	2	BOLT 5/8 X 7/8
46	54363	2	PLATE DECAL
47	66579	1	HANDLE RCHAB
48	54591	2	WASHER
49	74161	3	DECAL KIN CON
50	60692	1	SPLIT PIN #3/16 X 1
51	57371	1	FOOT PEDAL
52	57359	1	LOCK BRACKET
53	61838	2	BUSHING
54	62066	2	SCREW 1/4-20 x 5/8

ITEM	P/N	QTY	DESCRIPTION
55	50680	2	E-RING
56	57366	1	SHAFT
57	54811	1	PATIENT SWITCH JACK BRKT. (NOT SHOWN)
58	73540	1	JACK FOR PATIENT SWITCH (NOT SHOWN)
59	65016	1	MICRO SWITCH
60	57568	2	SPLIT PIN #1/2 x .7/8
61	57553	2	SAFETY WALK PAD
62	57374	1	PLATE, HEIGHT INDICATOR
63	60800	2	SCREW 4-40 x 5/8
64	57332	1	SPRING TORSION
65	54899	1	STRAP PATIENT CORD HOLDER
66	57417	1	DECAL FOOT PEDAL UNLOCKED
67	57416	1	DECAL FOOT PEDAL LOCKED



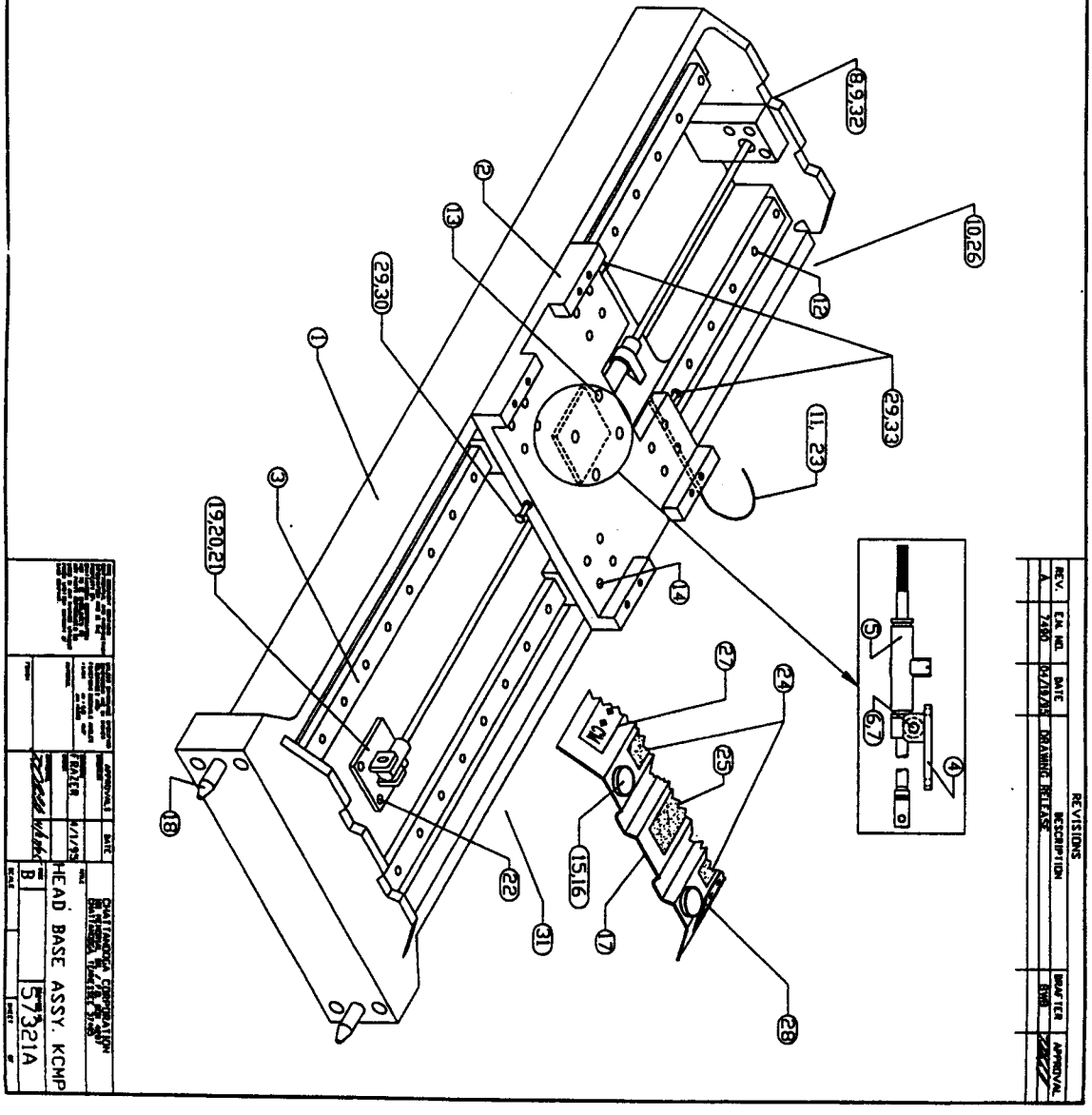
AP Head Base Assembly – 57334



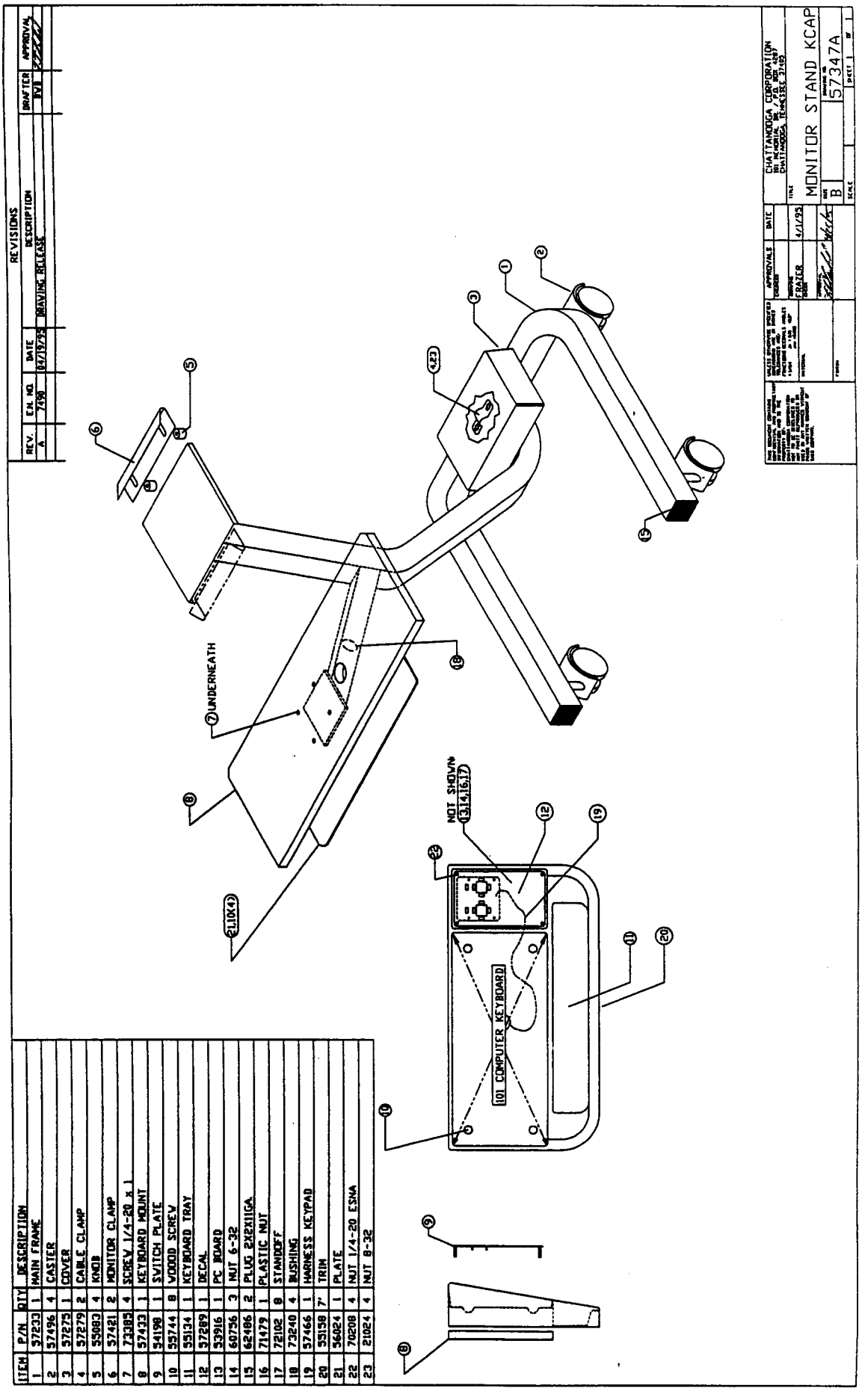
ITEM	P/N	QTY	DESCRIPTION
1	57201	1	BASE CASTING
2	57494	1	CARRIAGE CASTING
3	53904	2	LINEAR BEARING ASSEMBLY
4	57379	1	NUT BRACKET
5	54211	1	BALL SCREW NUT
6	54214	2	PIVOT PIN
7	54749	2	SOC SET SCREW #8-32X3/8
8	61684	4	SHCS 1/4-28 X 1/2
9	52277	4	SHCS 1/4-20X2-1/4
10	57492	1	CABLE TROUGH
11	54693	2	MOTOR PLATE
12	54314	36	SHCS M6-1 X 20MM
13	54312	16	SHCS M6-1 X 16MM
14	54613	1	BASE COVER
15	73208	4	FHSCS 1/4-20 X 3/4
16	55598	4	NYLON WASHER
17	54216	2	GUIDE PIN
18	62951	5	SCREW 1/4-20 x 3/4
19	63484	2	BHSCS 3/8-16 X 1
20	70251	1	BUSHING, BRONZE BUNTING FL50-4
21	54215	1	BUSHING PLATE KC AP
22	54210	1	ANGLE BRACKET KC AP
23	54616	2	WASHER TRB-815 .060 THK.
24	54617	1	THRUST BEARING TORRINGTON NTA-816
25	61602	2	HEX JAM NUT 1/2-20
26	54380	1	ACTUATOR FASCO 32"
27	54250	1	COVER MOTOR
28	52294	8'	SAFETY WALK 1"
29	52295	4'	SAFETY WALK 2"
30	60416	3	SCREW 1/4-20 x 1
31	62983	3	NUT 1/4-20
32	55128	2	CLAMP CABLE
33	21733	1	NUT 8-32 ESNA
34	57556	1	CLAMP CABLE
35	57396	1	HARNESS HEAD POWER
36	57399	1	HARNESS HEAD SIG
37	57467	1	HARNESS POT SIGNAL
38	57468	1	HARNESS UMBILICAL
39	20190	4	SCREW 10-24 x 3/8 BUTTON HEAD
40	54567	1	DECAL HEAD SECT RIGHT
41	54568	1	DECAL HEAD SECT LEFT
42	57418	1	DECAL END CASTING

MP Head Base Assembly – 57321

ITEM	P/N	QTY	DESCRIPTION
1	57201	1	BASE CASTING
2	57494	1	CARRIAGE CASTING
3	53904	2	LINEAR BEARING ASSEMBLY
4	57378	1	LOCK BRKT
5	57448	1	MECH. LOCK
6	66224	1	5/16-18 x 2-1/2 HEX HD
7	87561	1	ESNA NUT 5/16-18
8	60544	2	3/8-24 JAM NUT
9	21393	1	3/8 FW
10	57492	1	CABLE TROUGH
11	57443	1	FLEXIBLE CABLE
12	54314	36	SHCS M6-1 X 20MM
13	61684	4	SHCS 1/4-28 X 1/2
14	54312	16	SHCS M6-1 X 16MM
15	73208	4	FHSCS 1/4-20 X 3/4
16	55598	4	NYLON WASHER
17	54613	1	BASE COVER
18	54216	2	GUIDE PIN
19	57382	1	BRKT LOCK
20	63724	1	BOLT SHLDR 1/4 x 1-1/4
21	70213	1	ESNA NUT 1/4-20
22	63484	2	BHSCS 3/8-16 X 1
23	57557	1	RING RETAINER EXT.
24	52294	8'	SAFETY WALK 1'
25	52295	4'	SAFETY WALK 2'
26	62951	3	SCREW 1/4-20 x 3/4
27	57437	1	DECAL HEAD SECT RIGHT
28	57436	1	DECAL HEAD SECT LEFT
29	62983	1	NUT 1/4-20
30	60416	1	SCREW 1/4-20 x 1
31	57556	2	CLAMP CABLE
32	57418	1	DECAL END CASTING
33	60822	2	SCREW 1/4-20 x 1-3/4
34			
35			
36			
37			
38			
39			

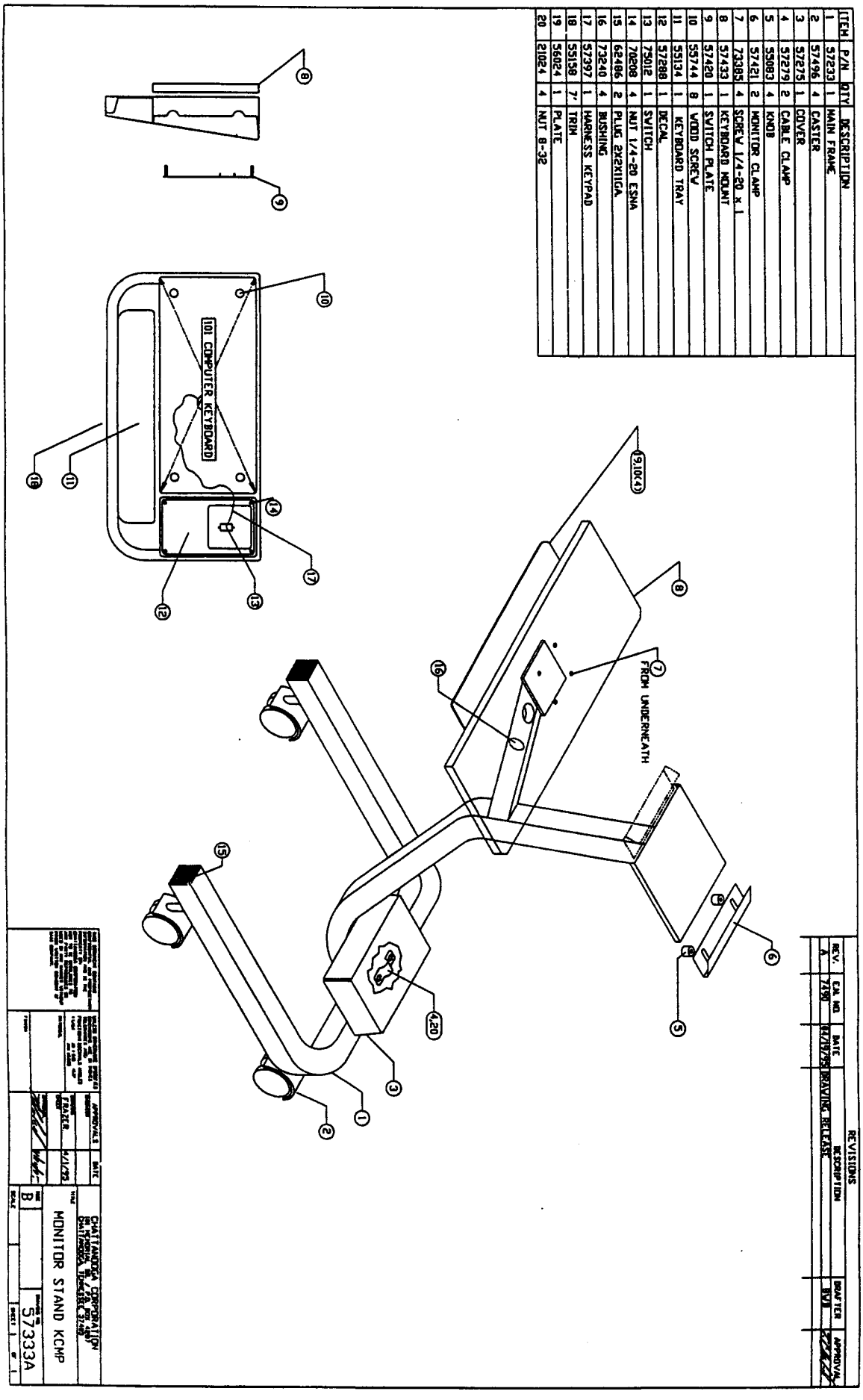


AP Monitor Stand – 57347



ITEM	P/N	QTY	DESCRIPTION
1	37233	1	MAIN FRAME
2	57496	4	CASTER
3	57275	1	COVER
4	57279	2	CABLE CLAMP
5	55083	4	KNOB
6	57421	2	MONITOR CLAMP
7	72385	4	SCREW 1/4-20 x 1
8	57433	1	KEYBOARD MOUNT
9	54198	1	SWITCH PLATE
10	55744	8	WOOOD SCREW
11	55134	1	KEYBOARD TRAY
12	37289	1	DECAL
13	53916	1	PC BOARD
14	60756	3	NUT 6-32
15	62486	2	PLUG 2X2X11GA
16	71479	1	PLASTIC NUT
17	72102	8	STANDOFF
18	73240	4	BUSHING
19	57466	1	HARNESS KEYPAD
20	55158	7"	TRIM
21	36024	1	PLATE
22	70208	4	NUT 1/4-20 ESNA
23	21024	4	NUT 8-32

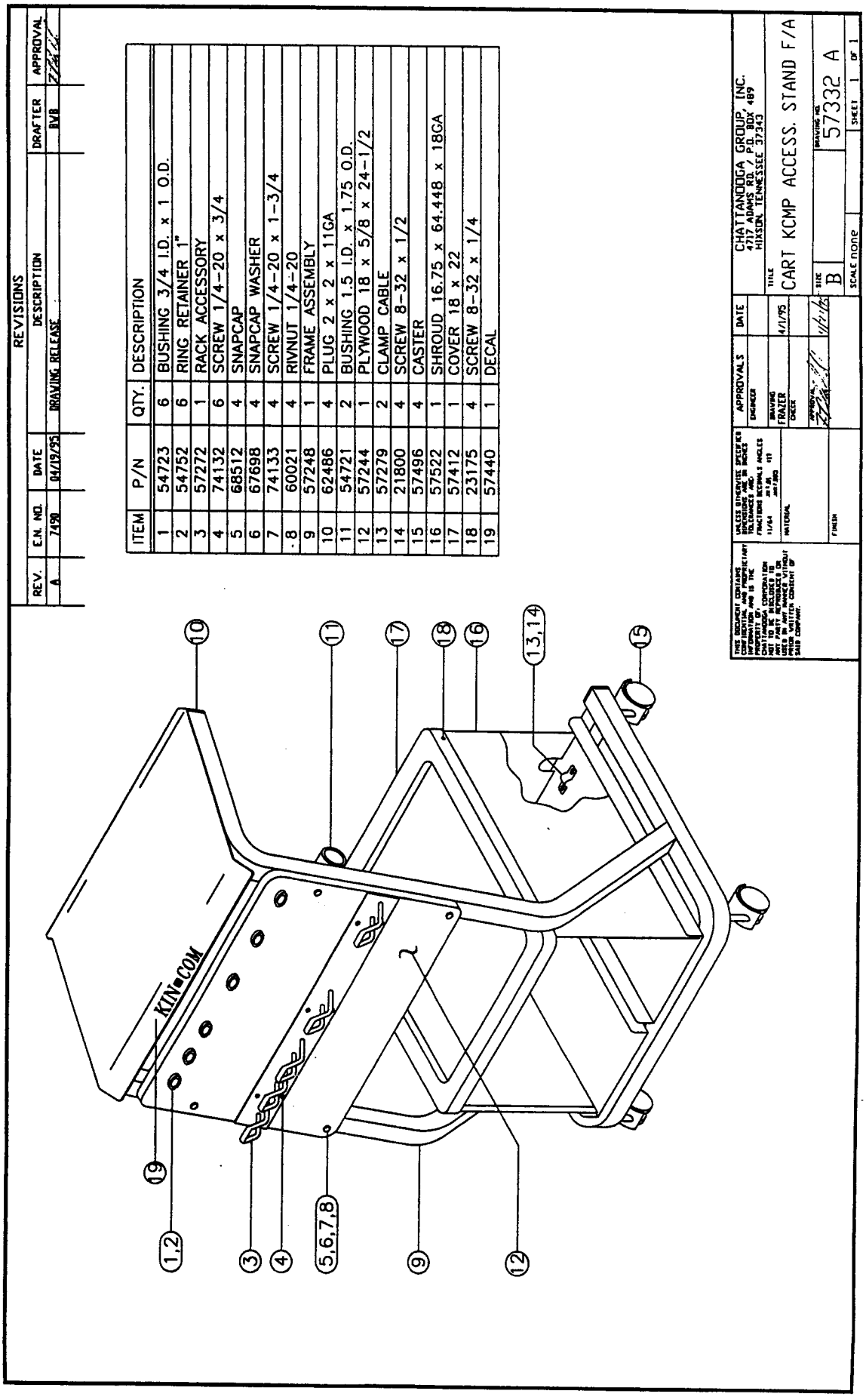
MP Monitor Stand – 57333



ITEM	P/N	QTY	DESCRIPTION
1	57233	1	MAIN FRAME
2	57496	4	CASTER
3	57275	1	COVER
4	57279	2	CABLE CLAMP
5	55083	4	KNOB
6	57421	2	MONITOR CLAMP
7	73385	4	SCREW 1/4-20 x 1
8	57433	1	KEYBOARD MOUNT
9	57420	1	SWITCH PLATE
10	55744	8	WOOD SCREW
11	55134	1	KEYBOARD TRAY
12	57288	1	DECAL
13	75012	1	SWITCH
14	70208	4	NUT 1/4-20 ESNA
15	62486	2	PLUG 2X2X11GA
16	73240	4	BUSHING
17	57397	1	HARNESS KEYPAD
18	55158	7"	TRIM
19	56024	1	PLATE
20	21024	4	NUT 8-32

REVISIONS				
REV.	ECN NO.	DATE	DESCRIPTION	DRAFTER / APPROVAL
A	7450	6/15/95	DRAWING RELEASE	BWJ

Accessory Cart Stand – 57332



SECTION

9

Protective Systems

Manual Protective Systems

The KIN-COM is equipped with two manual protective devices. These devices are the Patient Abort Switch and Emergency Stop Pins.

The Patient Abort Switch is a device activated by the patient when the patient believes an unanticipated event is occurring. This device will turn "OFF" the watchdog circuit. The watchdog circuit will then turn "OFF" the motor and power circuits. This creates an error detected by the software and is displayed on the monitor.

The Emergency Stop Pins are physical (mechanical) stops used as backup to the Automatic Protective System. The correct application of these stops are the responsibility of the operator. Automatic Protective Systems

The KIN-COM utilizes several analog and digital signals to track the protective systems on the KIN-COM. All of the signals are sampled 100 times a second. The analog and digital signals are constantly checked and cross checked against each other for accuracy and reliability.

The analog signals undergo a conversion to digital signals that the computer can understand. These signals are the angle (potentiometer), speed (tachometer), and the force (load cell) signals. The digital signals include the power supply control, power supply sense, amplifier control, amplifier sense, and other signals that determine the condition of the machine.

The watchdog circuitry is designed to watch the computer for lock-up. The digital lines to the watchdogs from the computer must toggle at a constant 5OHz rate. If this rate varies the watchdogs will interrupt the operation of the unit. If any other error occurs, the watchdogs are turned off, along with the power supply and amplifier signals, by the software.

Listed below are the error code numbers, a brief description of the error, and some helpful hints as to possible causes. The errors are listed numerically for easy reference.

Error Code Descriptions

Various errors can result if the machine is not set up properly, connections are intermittent, or amplifier circuitry drifts due to age or excessive temperature. Following is a list of errors that may crop up during manufacturing of the KIN-COM MP.

Angle Error

These are the codes and explanations for the errors that can occur if a problem arises from angle discrepancy:

11 This error will only occur when the amplifier is on which will be during exercise or test, not during setup. During setup the higher angle is determined when the most positive position is selected as a stop point. If for any reason the arm travels beyond this point, (i.e. outside the upper range of motion) error 11 will occur. Possible causes of this error are: amplifier current output insufficient to control stopping power, mechanical linkage is inconsistent (i.e. loose drive belt), electrical components are drifting due to age or temperature, A/D converter is erratic.

12 This error will only occur when the amplifier is on which will be during exercise or test, not during setup. During setup the lower angle is determined when the most negative position is selected as a stop point. If for any reason the arm travels beyond this point, (i.e. outside the lower range of motion) error 12 will occur. Possible causes of this error are: amplifier current output insufficient to control stopping power, mechanical linkage is inconsistent (i.e. loose drive belt), electrical components are drifting due to age or temperature, A/D converter is erratic.

13 This error occurs when there is a sudden shift in the arm position. It can happen when the amplifier is inhibited or when its not. If the amplifier is on, a correction occurs to get the predicted shift. If the predicted shift is within the allowable range, no error will occur.

14 This error occurs when there is a difference between the calculated velocity (determined by angle displacement / time) is greater than the actual velocity as read by the tachometer.

17 This error occurs when the voltage input from the potentiometer exceeds the maximum limit that the 12 bit converter can handle. At present, this voltage is 110V. The control code will produce this error when a digital reading exceeding 2040 is reached.

19 This error occurs when the amplifier is on and the arm deviates from it's normal fixation point. This error may show up if high forces are placed on the arm during fixation. To prevent this, ensure that switch two of the amplifier is always set to the "ON" position.

Velocity Error

These are the codes and explanations for the errors that can occur if a problem arises from a velocity discrepancy:

23 This error occurs when there is a sudden shift in velocity. If the amplifier is inhibited we allow twice the value for velocity shifts. If the amplifier is on, the shift is compared to the last shift to which a calculated value is added that depends on the programmed speed.

24 This error occurs when the amplifier is on and there is a difference between the measured velocity and the programmed velocity set by the user. More velocity deviation is allowed in isotonic mode due to the nature of the exercise even when a low speed upper limit is programmed.

27 This error occurs when the voltage input from the tachometer exceeds the maximum limit that the 12 bit converter can handle. At present, this voltage is 110V. The control code will produce this error when a digital reading exceeding 2040 is reached.

29 This error check scans for high, medium, and low velocity drifts from fixation (velocity zero). Errors have to be in sequence or the counter will reset to zero, therefore if three deviations from fixation occur under heavy loading or poor offset adjustment, an error will occur.

38 This error occurs when the actual velocity is continuously lagging the programmed velocity for more than .5 seconds. When the software detects a lagging velocity greater than .5% of the programmed velocity, it will make adjustments to accelerate the arm to the proper speed. If the correction is unsuccessful after .5 seconds, the software will shut the unit down. This error can occur under very heavy loads or under heavy loading combined with a low line voltage.

Force Error

These are the codes and explanations for the errors that can occur if a problem arises from a loadcell or force discrepancy:

1 This error occurs when the programmed force limits have been exceeded during an exercise or test in isokinetic mode.

33 This error occurs when the change in force is quicker than 600 newtons per sample period (10ms.). This error detects upsets to the loadcell that may be detrimental to the equipment.

37 This error occurs when the voltage input from the loadcell exceeds the maximum limit that the 12 bit converter can handle. At present, this voltage is 110V. The control code will produce this error when a digital reading exceeding 2040 is reached.

Other Errors

41 This error occurs when software does not read a feedback signal that represents the true value of the power supply. If the software turns the power supply to the amplifier on, then the feedback signal should indicate that the power supply is actually on. If the software has not turned the power supply to the amplifier on, then the feedback signal should indicate that it's off. Any other condition will produce this error.

41 This error occurs when software does not read a feedback signal that represents the true value of the amplifier enable. If the software turns the amplifier on, then the feedback signal should indicate that the amplifier is actually on. If the software has not turned the amplifier on, then the feedback signal should indicate that it's off. Any other condition will produce this error.

80 This error occurs when the software detects an open circuit in the patient abort switch and in the case of the MP, the head locking device is also not completely engaged. These two devices will cause an immediate shutdown of the motor circuitry if depressed.

Installation Instructions for Multi-Mode Dynamometers

SECTION 10

NOTE: Before beginning, check to be sure that the unit is properly located within the facility (see Figure 3). Also, be sure the unit has been properly leveled.

Unpacking

Step 1 Remove the Accessory Cart and the Monitor Stand from their shipping containers and remove all packing materials.

Step 2 Remove the computer, monitor, printer, powerbox and mains box from their shipping containers and remove all packing materials.

Step 3 Remove the packing materials from the Head and Seat bases including the cables, harnesses and connectors.

Step 4 Remove the packing materials from all attachments and accessories.

Step 5 Inspect all parts for concealed shipping damage. Replacement parts for any missing or damaged parts may be obtained by ordering them from the Chattanooga Group Service Department at 1-800-322-7343. Refer to the parts lists and assembly drawings for detailed part information.

Monitor Stand Assembly (see Figure 1)

Step 1 Mount the keyboard tray to the Monitor Stand base using the four (4) screws provided.

Step 2 Route the keyboard cable through the hole in the keyboard tray and place the keyboard (with built in feet extended) in the tray.

Step 3 Loosen the four (4) knurled knobs on the monitor mount and slide the mounting brackets apart.

Step 4 With the swivel base attached to the monitor and adjusted to the center of rotation, place the monitor on the Monitor Stand with the screen facing the keyboard.

Step 5 Push the mounting brackets together firmly and tighten the four (4) knurled knobs. **Ensure that the monitor swivels equally in both directions.**

Step 6 Remove the plastic cover from the electrical junction box.

Step 7 Route the monitor cable(s) into the top hole of the frame, through the frame, and out the bottom slot using the cable pull provided (see Figure 1).

Step 8 Route the keyboard cable and keypad cable into the hole on the side of the frame, out the hole on the bottom of the frame, into the hole on the front of the frame and out the bottom slot using the cable pull provided (see Figure 1).

Step 9 Plug the monitor power cord into the monitor and connect the monitor power cord, keyboard, keypad, screentouch (if provided) and VGA signal cables to the appropriate connectors of the attached Monitor Stand cable. NOTE: All connectors are configured to prevent incorrect connections.

Step 10 Pull all excess cable toward the monitor and **ensure that the monitor cables allow the monitor to swivel freely.**

Step 11 Secure all cables in the cable clamp provided and replace the plastic cover.

Accessory Cart (see Figures 2 and 3)

Step 1 Remove the cover from the bottom of the Accessory Cart and place the printer, computer, powerbox and mains box on the accessory cart with the powerbox and computer flush with the front of the component trays (see Figure 2).

Step 2 **Route the monitor stand cable between the glide levelers of the head base and underneath the seat base** (see Figure 3).

Step 3 **Route the head base cable(s) underneath the seat base** (see Figure 3).

Step 4 Connect the Head base cable(s), the Seat base cable (if provided), the printer cables and the Monitor Stand cable to the appropriate connectors on the back of the computer and powerbox. NOTE: The connectors are labeled for proper connection and configured to prevent incorrect connection.

Step 5 Connect the computer power cable and the power cord to the mains box.

Step 6 Secure all cables that exit the accessory cart with the two cable clamps located at the back of the cart (see Figure 2).

Step 7 Secure the Monitor Stand cable to the back of the Seat base frame using the cable clamp provided. **Make sure that the monitor stand has 66 inches of cable between the monitor stand junction box and the head base** (see Figure 3).

Step 8 Place the attachments and accessories on the Accessory Cart noting the labeled locations.

Step 9 Connect the audio speakers (if provided) to the appropiate connectors on the rear of the computer.

Quality Assurance Check

Step 1 Plug the unit in and turn on the circuit breaker (located on the back of the mains box beneath the Accessory Cart cover) and turn on the power to the powerbox, computer, monitor and printer.

Step 3 From the introductory software display select the "Exit to DOS" option.

Step 4 Perform the "REHAB Product Assembly and Calibration Checklist" by inserting the "TECHNICIAN INSTALLATION DISK" in the "A" drive and typing: A:QA Then press enter.

Step 5 Fill in the appropriate information and then press F10.

Step 6 Follow the instruction on the screen to perform the KIN-COM acceptance checks.

NOTE: Remove the load cell from the lever arm and set it on the floor prior to performing the velocity/rom diagnostics checks.

Step 7 After all of the checks have been successfully completed, press "P" to print the Quality Assurance report.

Step 8 Ask an authorized person at the customers facility to sign the printed report. Return the signed report to the Chattanooga Group, Inc. for processing.

Final Checks

Step 1 Check **ALL** cables and cable clamps for proper installation.

Step 2 Place the cover back on the accessory cart being certain that the sides of the cover fit inside the component trays and that no cables or connectors are damaged.

Step 3 Place the audio speakers (if provided) on the attachment cart cover.

Step 4 Clean all exposed surfaces of the KIN-COM including the Head and Seat base, the Monitor Stand, the Accessory Cart and the Attachments and Accessories.

FIGURE 1: Assembly of the KIN-COM Monitor Stand.

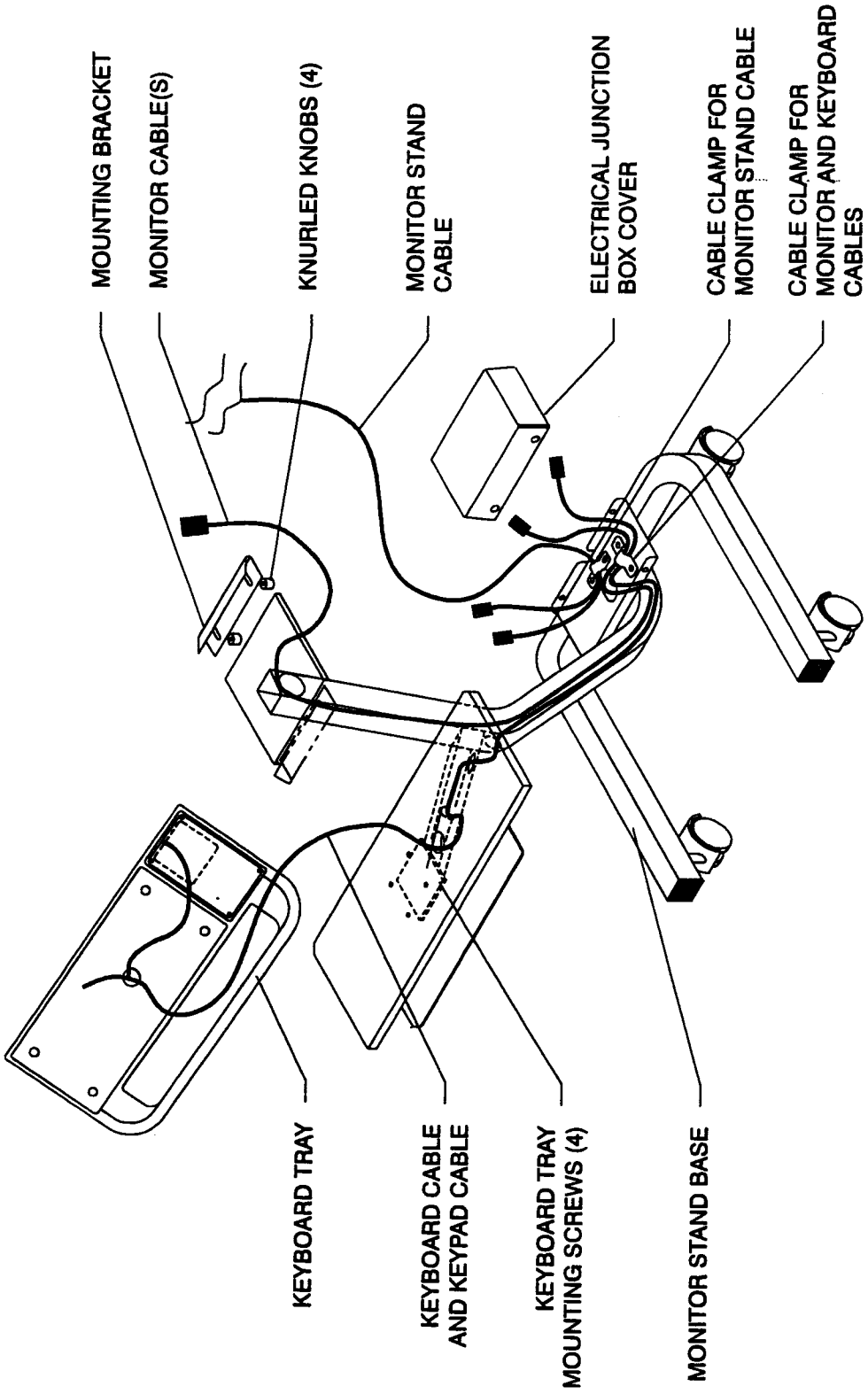


FIGURE 1: Assembly of the KIN-COM Monitor Stand.

FIGURE 2: Assembly of the KIN-COM Accessory Cart.

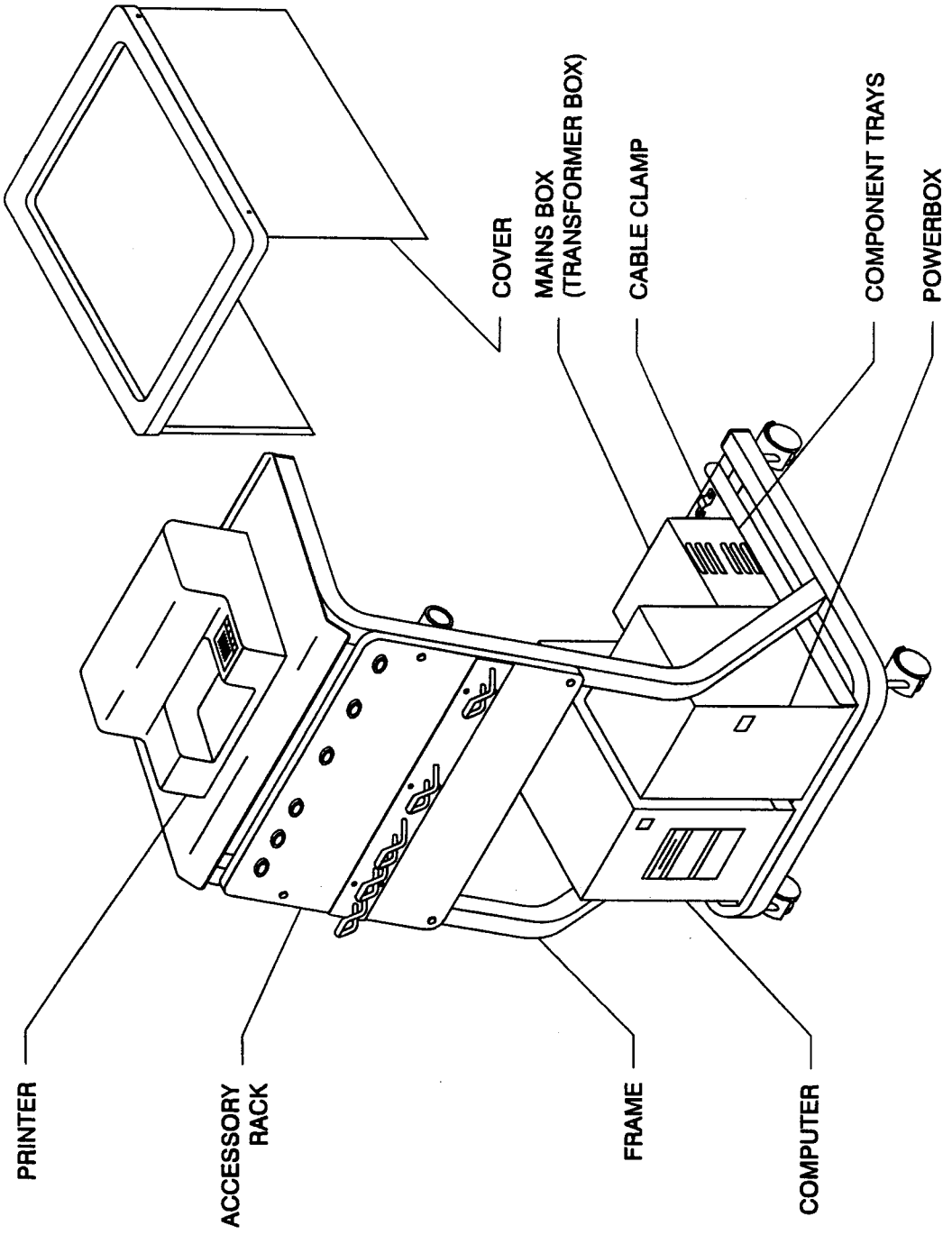


FIGURE 2: Assembly of the KIN-COM Accessory Cart.

FIGURE 3: Assembly of the KIN-COM Unit.

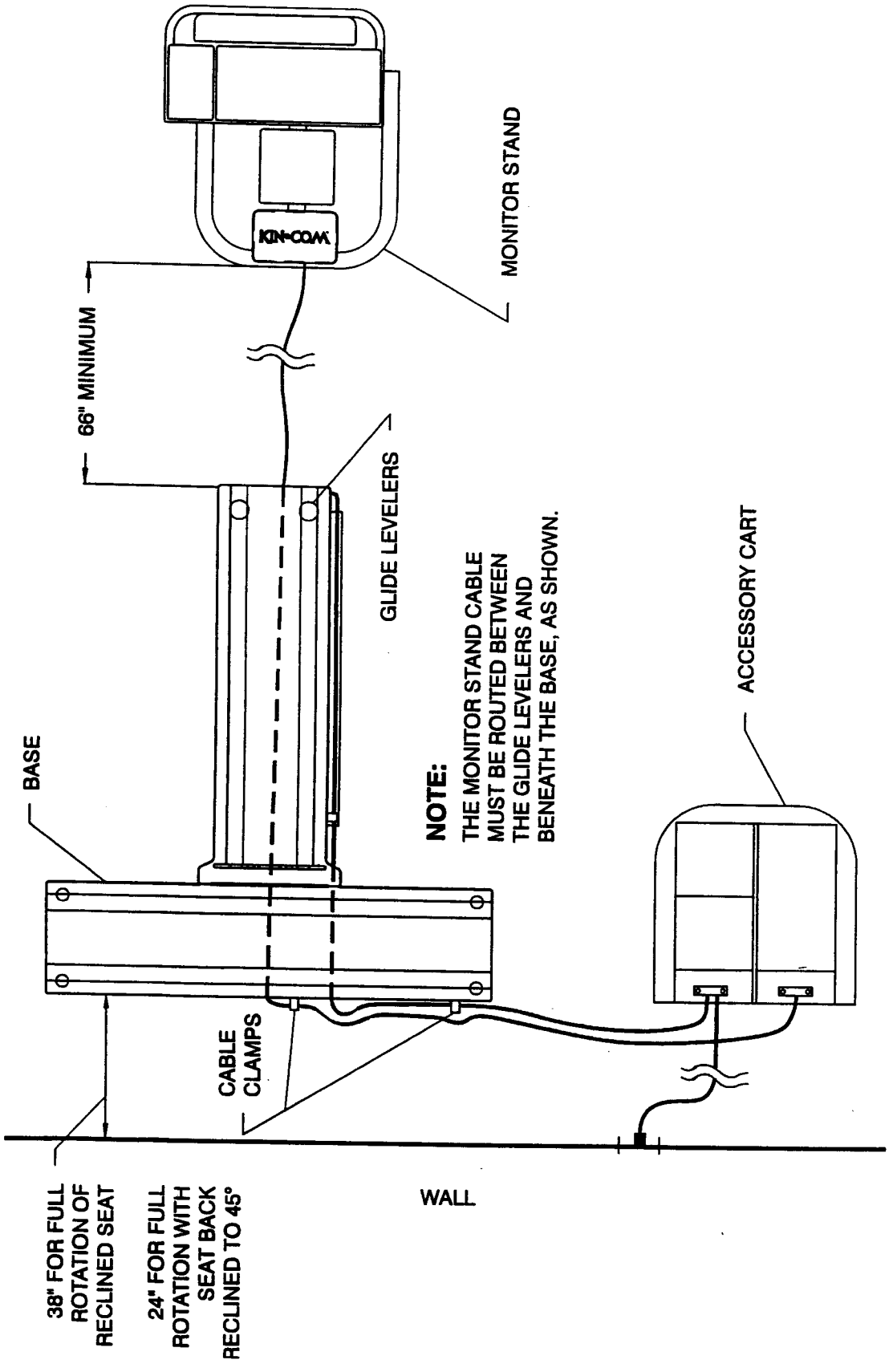


FIGURE 3: Assembly of the KIN-COM Unit.