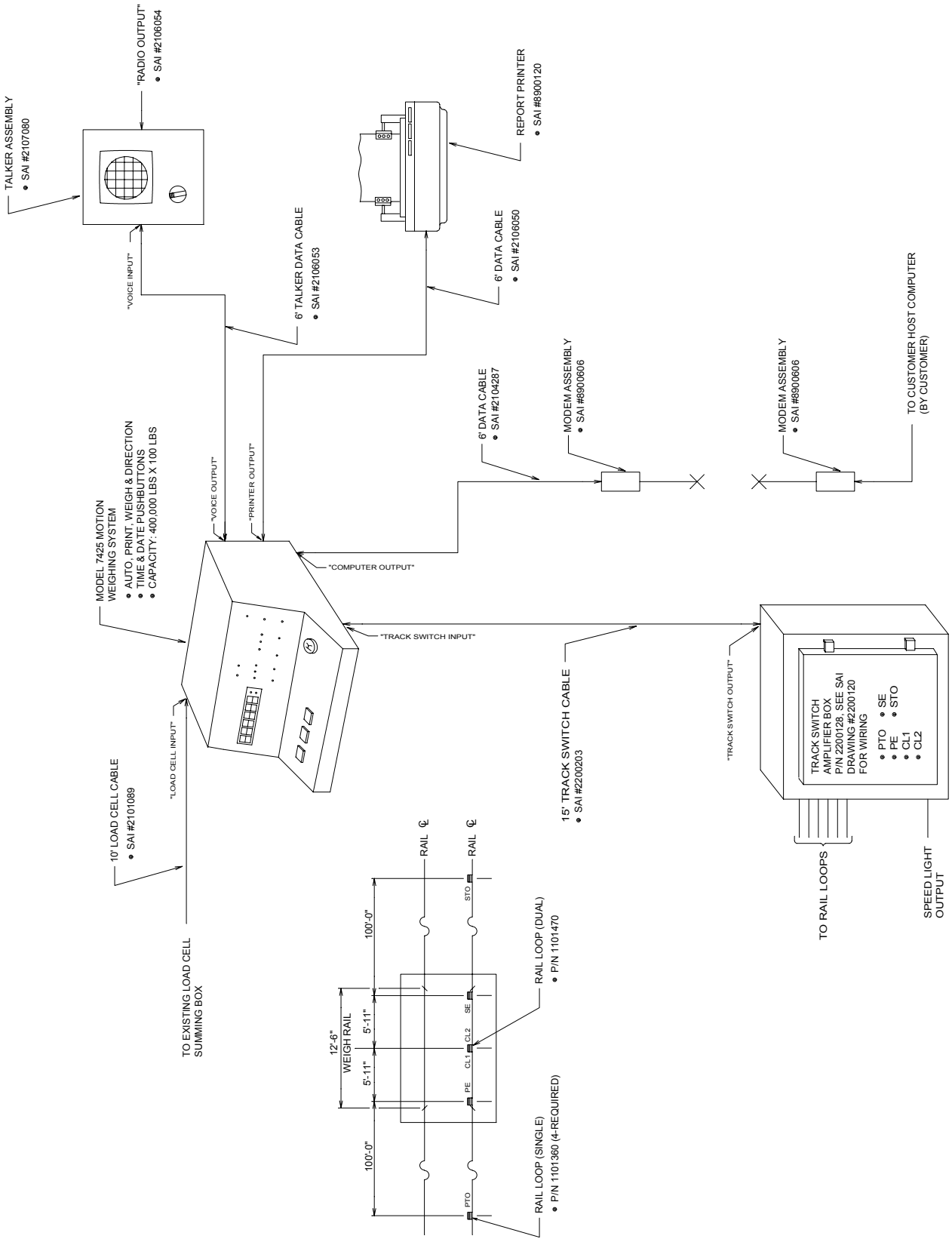
WHEELING LAKE ERIE
BREWSTER, OH

Project #BSC-0137

Model 7425

By
Systems Associates, Inc.
Serial #7425-1840
Capacity: 400,000 lb x 100 lb

MODEL 7425 MOTION WEIGHING SYSTEM
TABLE OF CONTENTS



CAD 304	REV		2113270
			SYSTEM LAYOUT

MODEL 7425 MOTION WEIGHING SYSTEM
SEQUENCE OF OPERATION

SET-UP

Power is to remain on at all times. In the event of a power failure or long term power-off condition, the following procedure is recommended.

1. Apply power to the instrumentation.

2. The instrument will perform a check/reset cycle on power up. During the check/reset cycle, the instrument will illuminate all front panel indicators to verify their proper operation. Upon completing this check cycle, it will enter the STANDBY mode of operation and continuously update the front panel weight display with the weight of the platform.

3. Operating the front panel RESET/ZERO key switch will cause the motion weighing system to run a check/calibrate cycle. This will act as a master reset for the system and upon completion, will zero the weight indication.

On units equipped with data terminals, the time and date will be set using the keyboard and display. Refer to the TIME AND DATE SET PROCEDURE following this sequence for details on setting the internal clock.

AUTO/MANUAL OPERATION

This system has two modes of weighing railroad cars. In the AUTOMATIC mode, the weighing system will automatically turn-on as the train approaches the weigh platform. A sensor located at both ends of the scale will sense the direction of travel and place the weighing system into the WEIGHING mode. The system will print all the standard messages as outlined in the Section titled STANDBY/WEIGH. In the MANUAL mode of operation, traffic passing over the scale will not cause the system to automatically enter the WEIGH mode.

The AUTOMATIC and MANUAL modes of operation are selected by pressing the AUTO pushbutton on the front panel of the Motion Weighing System. Each actuation of this pushbutton will cause the instrument to alternate modes.

In the MANUAL mode of operation, the operator is required to set the scale into the WEIGH mode, after selecting the proper direction on bi-directional systems, as the train is ready to weigh and after completion of weighing, return the system to the STANDBY mode. While the system is in the MANUAL mode, all automatic timers are reset.

In the AUTOMATIC mode of operation, the system will sense the presence of a train and enter the WEIGH mode of operation. If the system cannot enter the WEIGH mode of operation because of a system malfunction, the automatic turn-on will be inhibited until an internal train presence timer has timed out. This timer is actuated by any track switch activity and is set to one minute. This timer will be automatically reset in the MANUAL mode of operation.

BI-DIRECTIONAL

The following section applies to instruments with a bi-directional weighing package. For single direction systems, the following section may not apply. During initial set-up, the dip switches for direction should be set to the OFF position, if the bi-directional system is not included. For systems with bi-directional operation, the internal switches must be set up for the proper direction to enable the bi-directional package.

A pushbutton has been provided on the front panel to alternately select the two weighing directions. Two LED's provide the operator with the indication of the weighing direction. Arrows above each LED provide the specific direction of travel for the train. An internal dip switch has been provided to select

northbound/southbound, eastbound/westbound, or inbound/outbound operation. This is set up at the time of installation and will not require additional operation. Also, a dip switch has been provided to reverse the indicated direction on the system printout. This would reverse the northbound and southbound wording. Again, this switch is set up during the time of installation.

The operator should insure the proper weighing direction has been selected before placing the Motion Weighing System into the WEIGH mode of operation. If the train approaches from the wrong side, a message will be printed and the weighing system will be forced to the STANDBY mode of operation.

WEIGH/STANDBY

This motion weighing system has two basic ways of weighing railroad cars. In the "STANDBY" mode, the system is configured to provide static weights of railroad cars. In the "WEIGH" mode of operation, the system will automatically accumulate and record weights of railroad cars passing over the weighbridge in motion.

The WEIGH and STANDBY modes of operation are selected by pressing the WEIGH pushbutton on the front panel of the motion weighing system. Each actuation of this pushbutton will cause the instrument to alternately switch between WEIGH and STANDBY modes.

In the STANDBY mode of operation, the weight on the front panel weight indicator will continuously update. This weight can be zeroed by actuating the front panel Reset/Zero key switch. Note that during a Reset/Zero cycle, the instrument will perform a check cycle, illuminating all LED's for operator verification.

A front panel pushbutton has been provided to accumulate and print the static weights of railroad cars. This pushbutton will cause the system to accumulate the weight indicated by the platform scale when pushed and held for more than one second. As weight is accumulated, the light associated with the print pushbutton will illuminate indicating to the operator that an accumulated weight is present. Pressing the pushbutton for less than one second, will cause the weight indicated on the front panel display along with any previously accumulated weight to be recorded. In the STANDBY mode, all WEIGH mode controls and indicators will be reset. The LED's representing the track switch operation, will continue to function in the STANDBY mode. These indicators may be referenced for operator verification of proper operation.

In the WEIGH mode of operation, the system will automatically accumulate and record each car's weight as it passes over the weighing system. The front panel weight display will indicate successive readings of the railroad car as it passes over the weighbridge. All LED's on the system status indicator will be enabled to show the systems operation.

On entering the WEIGH mode of operation, the system will print out a header on the printer indicating the current status. This message will include the direction on bi-directional systems, the beginning time and date, the system calibration reference, and the system zero reference. An internal dip switch has been provided to force the system to STANDBY in the event of an out-of-tolerance message.

The calibration reference value represents the dead weight of the scale platform. An error in the calibration reference would indicate a problem with the weighbridge and/or with the digital weight indicator.

The calibration reference should be set to 10,000 lbs. (4,500 kgs.) and has a non-adjustable tolerance of 1,500 lbs. (680 kgs.) either plus or minus. Some fluctuation will be noticed in the calibration reference value and is normal as this represents the deadload of the platform. This weight will vary with a build-up of material such as snow, ice, and debris on the weighbridge itself. Also, some temperature variation is normal. This calibration value however, should be referenced by the scale operator for verification of proper operation. The operator may be fore-warned of a problem on inspection of the calibration reference, to prevent this out-of-tolerance condition.

The zero reference indicates that the platforms dead weight has been zeroed out prior to entering the weigh cycle. This zero reference will report an error, if it varies by more than 300 lbs. (140 kgs.). Again, fluctuations in this zero reference reading would indicate a problem with either the weighbridge or the digital weight indicator.

Provided both calibration and zero reference numbers are within tolerance, the system will print "Ready to Weigh" with the header information following.

As the system enters the STANDBY mode of operation, the system will report the mode change along with an ending time and date and an ending zero test. If no errors have been found during the weighing of the train, a gross weight total will be printed. The zero test printed at the end of the train is for reference purposes only.

COUPLED-IN-MOTION WEIGHING

1. The operator should place the weighing system into the WEIGH mode of operation by pressing the front panel WEIGH pushbutton.

   The system will run a check cycle and then enter the WEIGHING mode of operation. Depending on the option selected, the operator will be required to place the scale in the proper weighing direction before entering the WEIGH mode of operation. If the auto turn-on is enabled, then the DIRECTION and WEIGH modes are selected automatically.

2. The train should cross the scale at speeds of less than five (10 for high speed weighing) miles per hour. Note that poor train handling procedures will result in less accurate weight.

3. The weight indicator will automatically print out the car sequence number and gross weight for each car crossing the scale. If an error should occur during weighing, the appropriate message is printed along with the weight. A list of these messages is printed below:

   When an IN-MOTION system is operating properly, the pounds (LB) or kilograms (KG) abbreviation will be printed in the status column. The following are some other status words/definitions that might be printed:

   LIMIT - Speed of the train is approaching a FAST condition and should be slowed to prevent missing car weights. In the LIMIT condition a car weight will still be printed.

   FAST - Speed of the train has exceeded the maximum allowable speed for weighing. A car weight of 000000 will be printed. Cars weighed in the FAST condition must be re-weighed.

   HEAVY - This condition is set when a car has exceeded the overload limit. The overload value is either set in the programming or is user set in systems with a CRT.

   FRONT - This condition is set when the front end of a car is at least 10,000 lbs. (4,500 kgs.) heavier than the rear end.

   REAR - This condition is set when the rear end of a car is at least 10,000 lbs. (4,500 kgs.) heavier than the front end.

   ERROR - This condition will be set when there is a problem with either the digital indicator or the instrumentation.

   FST68 - This condition is set when the maximum allowable weighing speed for a six (6) or eight (8) axle car has been exceeded. The cars weighed in this condition must be re-weighed, at a slower speed.

   LMT68 - This condition is set when the speed of a six (6) or eight (8) axle car is approaching a FST68 condition. A weight will still be printed for cars in the LMT68 condition.

   SPEED - Some systems are equipped with a speed status. This condition is set when the car has exceeded the maximum allowable speed change between cars. This is user set on the CRT of PC.

4. When the weighing is complete, return the instrument to the STANDBY mode of operation. The end of train message will print, indicating the scale has properly entered the STANDBY mode of operation.

VOICE TRAIN CONTROL

This system has an internal voice train control system, which will provide a synthesized voice and a keying circuit for radio transmission to the train operator. This system will replace or augment the function of speed lights placed along the track.

Data transmitted by the system will include mode messages along with speed control. Mode messages will inform the train as the scale enters the WEIGH mode of operation and again when it returns to the STANDBY or NON WEIGH mode. During the weighing process, the system will report train speed at an interval to keep the train operator apprized of his speed condition. The interval is shortened when the speed increases.

Both range and miles per hour are selectable in four combinations. First, the speed can be annunciated in ranges. A description of ranges is provided below. Secondly, the mph may be annunciated giving the trainman the speed to the nearest tenth of a mile an hour. This format is also detailed below. Thirdly, mph can be annunciated with the inclusion of ranges when the train is moving at the limit speed or is in over speed condition. This mode will provide the train operator with the accurate mph along with the indication that his speed is too fast for proper weighing. Finally, both ranges and mph can be selected to give the operator both the mph and his speed condition. The choice of formats is set up using the internal selector switches.

- RANGE -

The following sequence of messages would be announced during the weighing of a train when the talker voice control system is set up for "ranges".

Message	Comment
"Scale Is Ready"	As scale goes to weigh.
"Scale Has Failed"	If the scale fails.
"Your Speed is OK"	Annunciated every five cars.
"Reduce Your Speed"	Annunciated each car at limit speed.
"Your Speed is Too Fast"	Annunciated for each car that is over speed.
"Scale Is Clear"	Annunciated when scale has finished weighing.

- MILES PER HOUR -

If the voice control system has been configured for miles per hour messages instead of range messages, the messages will be as follows. Speed will be annunciated in miles per hour to the nearest tenth of a mile per hour. For normal speed, the message will be given every 5 cars. At limit speed and over speed, the message is annunciated for each car.

Message	Comment
"Scale Is Ready"	As scale goes to weigh.
"Scale Has Failed"	If the scale fails.
"Your Speed is 6.2 mph"	Speed is given in mph.
"Scale Is Clear"	Annunciated when scale has finished weighing.

DIAGNOSTICS

This system performs diagnostics on the weight digitizer and the load cells and displays any error messages to the front panel display. The front panel display will illuminate with a two digit number in the least significant digits of the weight display when the error exists. During this time, the pounds/kilograms, center zero and motion LED's, will be turned off. The errors that are possible and the conditions which lead up to these errors are described in detail below.

01- This error indicates a loss of power to the internal Model 525 digitizer or a malfunction in that device. The error is sensed when the logic no longer receives an RS-232 serial input from the digitizer.

02- This error is generated any time the weight signal transmitted from the Model 525 indicator occurs, but is not in the proper format. This generally represents a 525 that is set up improperly and the 525 instrument should be set up using the parameters indicated in the Parameter Sheets later in this manual regarding the communication port. This error could represent a malfunctioning instrument, but will most often be an improper set up.

03- This error is generally caused by an invalid transmission from the Model 525 digitizer. This error is a function of the 525 in that the 525 designates the transmission as invalid. For example when the 525 is in the SETUP mode, an 03 error will occur.

04- This error is caused by the weight on the 525 being on overload, either positive or negative. This fault generally reflects a problem with the load cell input.

09- This error generally represents defective or unplugged load cells. The system will attempt to correct this problem automatically, as it will occur whenever the load cell signals are removed from a powered instrument. If the problem cannot be corrected automatically, the instrument will change to a 01 error indicating a defective system.

If an error is displayed on the front panel, the word ERROR will be printed next to any weight, if the system is in the WEIGH mode of operation. Weights obtained when an error is on the front panel are invalid and will be printed as zero. If a problem cannot be isolated and corrected, please contact the Service Department for additional help.

PRINTER INTERFACE

This system has been configured to operate with a dot matrix printer. Details on the printer itself may be found by referencing the dot matrix Printer Manual supplied separately for the printer.

Though most set up is accomplished using dip switches within the printer and described in the printer manual, some printer functions are set up through the motion weighing system itself.

The system will initiate a form feed when entering the STANDBY mode of operation and to skip over the perforation of an 11" form. To set the skip over perforation, place the motion weighing system into the WEIGH mode of operation, then into the STANDBY mode of operation. As the system enters the STANDBY mode of operation, a form feed will be generated and the top of form initiated. At this point, manually set the paper in the printer to extend approximately 1/4" above the print head. The forms option should work properly for form feeding when the scale goes into the STANDBY mode of operation and properly skipping the perforations during normal printing.

TIME AND DATE SET PROCEDURE
DISPLAY SERIES

An internal system time and date generator has been provided in this system to record as required the real time and date. The following description will provide the operator with instructions on how to set the internal time and date registers. The date will be automatically incremented each day and is automatically adjusted for the number of days in a month (except leap years)

The printed output of this time and date clock is in the following format:

"06:39 A 12/27/83"

Two pushbuttons have been provided on your system for the time and date setting function. The buttons are marked Sequence (SEQ) and Advance (ADV). The time and date will be set by following the description below.

Each actuation of the sequence pushbutton will highlight the following units:

Minutes Units
Minutes Tens
Hours Units
Hours Tens
AM/PM Units
Days Tens
Months Units
Months Tens
Years Units
Years Tens

If the sequence pushbutton is operated when the unit is highlighting "YEARS TENS", the sequence will automatically restore to "minutes units" and repeat the above cycle.

If the time indicated by the highlighted display is incorrect, it may be advanced by pressing the advance (ADV) pushbutton.

The displayed AM/PM indication will change when the advance button is depressed during the time the AM/PM character is highlighted.

Once the time and date has been correctly set, it may be reviewed by sequencing through the registers using the sequence (SEQ) pushbutton. An internal battery has been supplied to maintain the clock through a power interruption with sufficient supply to maintain the time and date for 30 days.

A SECONDS bar is located between the minutes tens and hours units displays. This bar will flash indicating at a one cycle per second rate. Note that certain processor operators may not update this display.

MODEL 215B
RAIL LOOP AMPLIFIER TUNING PROCEDURE

SWITCH SET-UP

The **MODE SWITCH** provides a means of frequency separation when more than one detector is used on a system. For normal operation, each detector should be placed in a different frequency position. As only three frequencies are provided, a system consisting of more than three detectors should have adjacent detectors tuned to alternate frequencies.

The **SENSITIVITY** switch provides on normal railroad applications, it is suggested that the sensitivity switch be adjusted to the medium position. If low objects are being erroneously detected, the detector may be positioned to minimum and conversely, if the sensitivity is too low, the detectors should be placed in maximum sensitivity.

The **PRESENCE SWITCH** should be set to the maximum position. This setting will prevent the detector from tuning out a wheel parked over the track loop.

A **TUNE SWITCH** has been provided to select either the TUNE, RESET, or OPERATING modes. This switch should be in the OPERATE position after tuning is complete. The detector should not be tuned while the tuned switch is in the OPERATE position.

TUNING PROCEDURE

1. Place all detectors into the TUNE mode.
2. Place the SENSE, PRESENCE and FREQUENCY mode switches into the proper desired position.
3. Turn the tuning knob to its full counter-clockwise position.
4. Turn the tune knob clockwise until the LED indicator illuminates.
5. Turn the tuning knob counter-clockwise until the light just extinguishes and continue turning counter-clockwise for approximately 1/8 of a turn.
6. Tune each track switch in this system before placing any track switches back into the OPERATING mode.
7. When tuning of all track switches is complete, insure that all detectors are in the OPERATING mode.

MODEL 215B
RAIL LOOP AMPLIFIER TUNING PROCEDURE

Continued

TESTING

The track detectors may be tested using a 3" x 5" piece of 22 gage low carbon steel at the ball of the rail and sliding it along passing over the top of the rail switch. The detector should indicate the presence of the metal at approximately 3" before and after the centerline of the switch has been passed. This will indicate a properly adjusted wheel switch. The switches should be monitored as traffic is run over the scale to insure proper operation.

WS-15 WHEEL SENSOR

The WS-15 railroad car wheel detector was developed for use in motion weighing of railroad cars. It is a non-contacting inductive device employing an ultra stable frequency modulation detector for maximum sensitivity, range and reliability.

The device requires a minimum of installation time. No special costly cable is required from the detector to the rail loop assembly. The detector is 100% solid state and will operate reliably at distances up to 1,000 ft. from the rail loop assembly.

The RL-15 rail loop assembly is designed for use on rail sizes from 100 lbs. to 140 lbs. and mounts easily with two 3/8" diameter bolts. As there is no sensitive electronics within the rail loop, it is not susceptible to shocks and/or vibration encountered in railroad applications.

SPECIFICATIONS

Input Power	117 VAC 50/60 Hz
Power Consumption	5 Watts
Output	Form C, 5 amp contacts
Connector	10 Pins MS front mounted
Temperature Range	-40 deg. to + 180 deg. F
Drift Compensation	Automatic
Maximum Sensitivity	.02% change in loop inductance
Maximum Lead-In	1,000' 2 conductor with shield, 18 gauge Twisted pair or approved equiv.
Lightning Protection	Total circuit including loop, line and earth circuits

MODEL 535B
RAIL LOOP AMPLIFIER TUNING PROCEDURE

535B WHEEL SENSOR

The RL-15 railroad car wheel detector was developed for use in the in-motion weighing of railroad cars. It is a non-contacting inductive device employing an ultra stable frequency modulation detector for maximum sensitivity, range and reliability.

The device requires a minimum of installation time. Two wire twisted cable is required from the Model 535B detector to the rail loop assembly. The amplifier is 100% solid state and will operate reliably at distances up to 1,000 ft. from the rail loop assembly.

The RL-15 rail loop assembly is designed for use on rail sizes from 100 lbs. to 140 lbs. and mounts easily with two 3/8" diameter bolts. As there is no sensitive electronics within the rail loop, it is not susceptible to shocks and/or vibration encountered in railroad applications.

SWITCH SET-UP

The **FREQUENCY SWITCHES** provide a means of frequency separation when more than one detector is used on a system. For normal operation, each detector should be placed in a different frequency position. When more amplifiers exist in a system than allowed frequencies, non-adjacent loop/amplifier combinations may share identical frequency settings.

Frequency #1 = Dip switch #1 OFF (left) and #2 OFF (left)
Frequency #2 = Dip switch #1 ON (right) and #2 OFF (left)
Frequency #3 = Dip switch #1 OFF (left) and #2 ON (right)
Frequency #4 = Dip switch #1 ON (right) and #2 ON (right)

The **SENSITIVITY** switches provide varying levels of amplifier sensitivity. In railroad applications, set the sensitivity as follows:

Rail Loop PN:	Sensitivity:	Description
1100420	8	Rail Loop - Dual (Old)
1100430	6	Rail Loop - Single (Old)
1100712	6	Rail Loop - Self-Test (Old)
1101360	5	Rail Loop - Single
1101440	5	Rail Loop - Self-Test
1101470	6	Rail Loop - Dual

Sensitivity setting combinations from 0 (Dip switch #3, 4, 5, and 6 set to OFF) thru 15 (Dip switch #3, 4, 5, and 6 set to ON)

The **PRESENCE SWITCHES** allow the amplifier to be set for various output duration configurations. In most applications, these switches will be set for HI and permanent presence. For this configuration, set the PR/PL switch to the PR (left) position and the LO/HI switch to the HI (right) position. This setting will allow the detection of a wheel parked over the track loop for a period of up to two hours.

A **RESET SWITCH** has been provided to initialize all amplifier logic and will force the amplifier to reset and correct its tuning for the connected loop. An amplifier without a proper loop connection will hunt for its correct tuning causing the front panel LEDS to flash.

MODEL 535B
RAIL LOOP AMPLIFIER TUNING PROCEDURE

Continued

TUNING PROCEDURE

1. Insure all loops are properly connected to their respective amplifiers.
2. Place the FREQUENCY, SENSITIVITY, and PRESENCE selector switches into the proper position.
3. Press the RESET pushbutton to establish the optimum tuning. After the switch has been depressed both LEDS will illuminate for a few seconds and after LEDS go out, the amplifier is tuned.
4. When tuning all track switches is complete, insure that all detectors operate using the testing procedure as follows.

TESTING

The track detectors may be tested using a 4" x 4" piece of 22 gage low carbon steel at the ball of the rail and sliding it along passing over the top of the rail loop. The detector should indicate the presence of the metal at approximately 3" before and after the centerline of the switch has been passed. This will indicate a properly adjusted rail loop amplifier. The switches should be monitored as traffic is run over the scale to insure proper operation.

FAULT DETECTION

If the FAULT light is flashing, there is a faulty connection, cable, or loop. Check all connections, replace the loop, or contact our Technical Services Department for help correcting the fault.

SPECIFICATIONS

Input Power	117 VAC 50/60 Hz
Power Consumption	5 Watts
Output	Form C, 5 amp contacts
Connector	10 Pins MS front mounted
Temperature Range	-40 deg. to + 180 deg. F
Drift Compensation	Automatic
Maximum Sensitivity	.02% change in loop inductance
Maximum Lead-In	1,000' 2 conductor with shielded, 18 gauge Twisted pair or approved equiv.
Lightning Protection	Total circuit including loop, line and earth circuits

MODEL NT11
RAIL LOOP AMPLIFIER TUNING PROCEDURE

NT11 WHEEL SENSOR

The RL-15 railroad car wheel detector was developed for use in the in-motion weighing of railroad cars. It is a non-contacting inductive device employing an ultra stable frequency modulation detector for maximum sensitivity, range and reliability.

The device requires a minimum of installation time. Two wire twisted cable is required from the Model NT11 detector to the rail loop assembly. The amplifier is 100% solid state and will operate reliably at distances up to 1,000 ft. from the rail loop assembly.

The RL-15 rail loop assembly is designed for use on rail sizes from 100 lbs. to 140 lbs. and mounts easily with two 3/8" diameter bolts. As there is no sensitive electronics within the rail loop, it is not susceptible to shocks and/or vibration encountered in railroad applications.

SWITCH SET-UP

The **FREQUENCY SWITCHES** provide a means of frequency separation when more than one detector is used on a system. For normal operation, each detector should be placed in a different frequency position. When more amplifiers exist in a system than allowed frequencies, non-adjacent loop/amplifier combinations may share identical frequency settings.

Frequency #1 = Dip switch #1 OFF (right) and #2 OFF (right)
Frequency #2 = Dip switch #2 ON (left) and #1 OFF (right)
Frequency #3 = Dip switch #2 OFF (right) and #1 ON (left)
Frequency #4 = Dip switch #1 ON (left) and #2 ON (left)

The **SENSITIVITY** switches provide varying levels of amplifier sensitivity. In railroad applications, set the sensitivity as follows:

Rail Loop PN:	Sensitivity:	Description
1100420	10	Rail Loop - Dual (Old)
1100430	8	Rail Loop - Single (Old)
1100712	8	Rail Loop - Self-Test (Old)
1101360	7	Rail Loop - Single
1101440	7	Rail Loop - Self-Test
1101470	8	Rail Loop - Dual

Sensitivity setting combinations from 0 (Dip switch #5, 6, 7, and 8 set to OFF) thru 15 (Dip switch #5, 6, 7, and 8 set to ON)

The **PRESENCE SWITCHES** allow the amplifier to be set for various output duration configurations. In most applications, these switches will be set for SH. For this configuration, set the PRES/PLS switch to the PRES (left) position and the LONG/SH switch to the SH(RIGHT) position. Permanent presence setting will allow the detection of a wheel parked over the track loop for a longer periods(if required).

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A **RESET SWITCH** has been provided to initialize all amplifier logic and will force the amplifier to reset and correct its tuning for the connected loop. An amplifier without a proper loop connection will hunt for its correct tuning causing the front panel LEDS to flash.

MODEL NT11
RAIL LOOP AMPLIFIER TUNING PROCEDURE

TUNING PROCEDURE

1. Insure all loops are properly connected to their respective amplifiers.
2. Place the FREQUENCY, SENSITIVITY, and PRESENCE selector switches into the proper position.
3. Press the RESET pushbutton to establish the optimum tuning. After the switch has been depressed NO LEDS will illuminate and the amplifier is tuned.
4. When tuning all track switches is complete, insure that all detectors operate using the testing procedure as follows.

TESTING

The track detectors may be tested using a 4" x 4" piece of 22 gage low carbon steel at the ball of the rail and sliding it along passing over the top of the rail loop. The detector should indicate the presence of the metal at approximately 3" before and after the centerline of the switch has been passed. This will indicate a properly adjusted rail loop amplifier. The switches should be monitored as traffic is run over the scale to insure proper operation.

FAULT DETECTION

If the FAULT light is flashing, there is a faulty connection, cable, or loop.
Fault conditions are as follows:

1. Solid Yellow - Current fault
2. 1 flash and a pause - Open circuit loop
3. 2 flashes and a pause - Shorted loop
4. 3 flashes and a pause -25% Delta L

Check all connections, replace the loop, or contact our Technical Services Department for help correcting the fault.

SPECIFICATIONS

Input Power	117 VAC 50/60 Hz
Power Consumption	5 Watts
Output	Solid State
Connector	10 Pins MS front mounted
Temperature Range	-40 deg. to + 180 deg. F
Drift Compensation	Automatic
Maximum Sensitivity	.02% change in loop inductance
Maximum Lead-In	1,000' 2 conductor with shielded, 18 gauge Twisted pair or approved equiv.
Lightning Protection	Total circuit including loop, line and earth circuits

STEP BY STEP CALIBRATION PROCEDURE FOR A MODEL 525 DIGITAL INDICATOR

Following is a step-by-step procedure which can be used for most calibration operations.

1. Put the Model 525 into the SET-UP mode by switching the back panel switch to the down position.
2. Press “SELECT” and “2" simultaneously. Display should read “SEL REG”.
3. Press the “ENTER” button twice. Display should read “CAL”.
4. Press the “SELECT” button once. Display should read “DEADLD.”
5. Make sure the scale is clear of any weight and then press the “PRINT (Store)” button once. The display should read “WORKING” for about 10 seconds, then it should read “CAL WT”. At this point, put the test weight on the scale.
6. After the test weight is on the scale and is stable, press the “SELECT” button once. The display should read the capacity weight that was set into the parameter section. Enter the weight of the test weight into the 525 via the 525 numeric key pad. Press the “PRINT (Store)” button, and the display should read “WORKING” for about 10 seconds, then it should read “SELFCHK”.
7. Press the “PRINT” (Store)” button once. The display should read “WORKING” for about 10 seconds and then the display should read “TWEAK”. At this point, hit the “DELETE” button twice and the display should go into the check cycle (all segments lit).
8. After the display comes out of the check cycle, take the 525 out of the SET-UP mode by returning the back panel switch to the up position.
9. The display should be showing the weight the 525 was calibrated to plus or minus 1 division and stable.
10. Remove the test weight from the scale. The display should read zero plus of minus 1 division.
11. Put the test weight back on the scale. The display should read the 525 was calibrated to plus or minus 1 division.
12. Remove the test weight from the scale. The display should read zero plus or minus 1 division.
13. The calibration procedure is now completed.

CALIBRATION PROCEDURE FOR SYSTEMS ASSOCIATES, INC. MOTION WEIGHING SYSTEMS (MODEL 525 BASE)

INTRODUCTION

The Model 7425 motion weighing system introduces digital calibration to Systems Associates line of motion weighing systems. In order to provide accurate weighing, both statically and in-motion and to compensate for minor variances in the track conditions, digital correction is included for each direction of motion weighing and for static weighing. LED's are provided to indicate when the dynamic adjustments are in service to provide the technician with quick and positive identification of those adjustments that are active.

Note that whenever a railroad weighing system is calibrated, the calibration and testing procedures as outlined by the AAR Scale Handbook, NIST Handbook 44 state authority, and the servicing railroad along with other responsible agencies should be followed.

In a new installation, all dip switches should be set to their open or off position and the Model 525 calibration procedure should be utilized for statically calibrating the digital indicator. The dip switch provided for fine adjustments of the static span can be used in lieu of the 525 calibration procedure to provide minor adjustments after the initial calibration. The motion dip switches will provide adjustments for minor compensations required during initial set-up and at re-certification periods.

When adjusting existing installations, the technician must choose between re-calibrating the Model 525 indicator and using the dip switch adjustments. Typically, the Model 525 indicator would be calibrated if it were changed or a load cell was changed, implying that all three (static, primary direction, and secondary direction) calibration references would have changed equally. Calibrating the Model 525 indicator in this example, would leave the relative adjustments of the motion dip switches in tact. If the system requires a minor adjustment to the static span and no equipment has been changed, the static dip switch would be used to make this adjustment.

SECTION TESTING

The two sections of the weighbridge should be tested statically before any motion tests are run. Generally, a 80,000 lb. (36,300 kg.) or greater composite test car or a ram test car would be used to test these sections. H-44 requires a minimum of 30,000 lbs. (13,600 kg.) to test a railroad track scale. In some instances, a loaded car may also be used if a test car is not available. The purpose of section testing a platform is to insure that all points of the platform read the same for the same applied load. Terminals have been provided in the summing box for matching resistors should the sections require matching, or the summing board has variable resistors for making sectional adjustments. In new applications, the load cell sections should be matched to within 20 lbs. (10 kg.) of one another. On re-certification, the sections should be matched within 40 lbs. (20 kg.).

Should the sections require matching on a terminal summing board, the highest sections output should be reduced to match the lower sections. After the initial calibration, the sections may be matched by reducing existing matching resistors as required. It is good practice to have one section, the section with the lowest output, without matching resistance. If adjustments are necessary a variable resistor summing board the excitation voltage of the section(s) to be adjusted should be monitored with a voltmeter. Adjustments should be in the tenth to hundredth of a volt scale. The weight indicator should be zeroed after every adjustment.

Though most section calibration is done by the "seat of the pants" method, there is a formula for determining the amount of resistance to properly match a load cell section. The formula is as follows:

Match Res = (Sec Wt - Low Sec Wt)/Low Sec Wt x Sec Res

WHEREAS:

MATCH RES is the resistance required to properly reduce the output on a high load cell or section.

SEC. WT. is the indicated weight when the test load was on the section to be matched.

LOW SEC. WT. is the indicated weight of the section with the lowest output.

SEC. RES. is the resistance of the load cell (load input impedance) or section (load cell input impedance/2) to be matched.

STATIC ADJUSTMENT

During initial calibration, the Model 525 would be calibrated using the procedure outlined in the Model 525 manual. Before beginning the static calibration procedure on an initial installation, the technician should set all of the span dip switches to their open or off positions.

After the initial certification, adjustments may be made to either the Model 525 digitizer directly or to the static dip switch located on the multi point span board. Typically, the Model 525 digitizer would be adjusted if the system had under gone a load cell or digitizer replacement. If a static calibration change is required in a system that has not had any repair work, the change would typically be made to the static dip switch.

The following procedure describes the method of adjusting the dip switch to adjust a span. The procedure listed below is identical for motion and static adjustments.

1. Determine percentage adjustment required. For instance, if a test car weighs 100,200 lbs. (45,500 kgs.) when it should weigh 100,000 lbs. (45,400 kgs.) even, the error would be +.20%.

2. Determine the amount of compensation already adjusted into the static dip switch using the following switch assignments.

   1 .01%
   2 .02%
   3 .04%
   4 .08%
   5 .10%
   6 .20%
   7 .40%
   8 On = add % and Off = subtract %

   For example, if switches 2 and 5 were turned On, the existing percentage would be .12%. If switch 8 was also turned OFF, then the adjustment would be -.12%.

3. Add the needed correction to the existing correction, to determine the new correction value. For example, if the existing correction is +.12% and the needed correction is -.20%, the new correction would be -.08%.

4. Make the adjustment determined in the previous calculation. For example, to enter a .08% correction, switch 4 should be On and all other switches Off.

5. Re-test the scale to assure that the new correction operates properly.

MOTION CALIBRATION PROCEDURE

NOTE: DO NOT RE-ADJUST THE STATIC CALIBRATION DURING THE MOTION TESTING.

After the completion of the SECTION CALIBRATION and STATIC CALIBRATION, the Motion Weighing

System is ready for the motion calibration. Appended to this calibration procedure are the requirements set forth by AAR Scale Handbook for Railroad Weighing Systems and the NIST Handbook 44 as pertaining to Coupled-In-Motion weighing systems. These references should be used for the proper procedure for testing a coupled-in-motion weighing system. These requirements may change from State to State and from time to time.

The outline of a motion weighing test detailed below is a condensed version of that recommended by the referenced information.

1. Generally, scale tests should not be performed under adverse weather conditions. If the motion certification must occur during adverse weather, a minimum amount of time should lapse between the static weighing of the railroad cars and the actual motion test. Often cars not susceptible to changing weight will be used during times of adverse weather.

2. A test train should be made up of cars similar to those being weighed under normal operating conditions (i.e. loaded cars, if loads are normally to be weighed).

3. Each car of the test train should be statically weighed, either two-draft on the scale being certified or, at a recently tested full draft static track scale. It is recommended that the full draft static track scale be inspected and re-certified before using its weights for the purpose of obtaining static weights.

4. On initial calibration, the test train should be weighed in-motion three times before any adjustments are made. These three initial runs will provide the preliminary information on repeatability and on calibration. After the completion of these three runs, the weight difference (static weight to motion weight) should be calculated on each car. The percentage error should then be calculated as the difference divided by the actual static weight, times 100. This formula is shown below.

$$\% \text{ error} = \frac{(\text{IND Wt} +\text{-} \text{ Static Wt})}{\text{Static Wt}} \times 100$$

WHEREAS:

% ERROR is the percentage difference from motion to static weights.

INDICATED WT. is the weight recorded on the motion system.

STATIC WT. is the weight recorded as the static weight.

Normally, the percentage errors will predominantly run in one direction, either positive or negative. An adjustment should be made at the end of the three runs providing the system was repeatable. If the errors seen are in excess of one percent and predominantly in one direction, the test should be stopped and the track conditions inspected for possible problems. Refer to section titled "Conditions Affecting Motion Weighing Accuracy" for help. Provided the results are repeatable and predominantly in one direction, the motion calibration procedure outlined below should be performed.

Once the initial motion runs are complete, the average percentage error should be calculated as the average of the errors found during these initial motion runs. This average percentage error will be used as the needed correction to the motion calibration switches for the selected direction. Refer to the Calibration Procedure listed in Steps 1 through 5 under the STATIC ADJUSTMENT section of this Calibration Procedure.

Remember to adjust only the calibration switch for the selected direction. When the forced weigh pushbutton on the 525 input logic is pressed, the LED associated with the selected direction will be illuminated to provide a positive indication of which set of switches is used for the direction indicated. It is important to adjust only the span switch for the direction being tested.

To view the motion calibration, a pushbutton switch has been provided on the 525 input board to allow the system to display the selected motion direction calibration while in the STANDBY mode of operation. Note that in the STANDBY mode of operation, the front panel weight display is continuously updated.

An LED has been provided to indicate which of the motion dipswitches on a bi-directional weighing system has been selected.

NO ADJUSTMENTS SHOULD BE MADE TO A CALIBRATION SWITCH WHOSE SELECTION LED INDICATOR IS NOT ILLUMINATED.

PROPER TRAIN HANDLING PROCEDURES ARE ESSENTIAL FOR REPEATABLE AND ACCURATE MOTION WEIGHTS. TRAIN SPEED SHOULD BE MAINTAINED FOR BEST PERFORMANCE OF THE WEIGHING SYSTEM.

5. After this preliminary calibration, the certification runs as indicated in the specifications of AAR, should be run for the motion certification. Each run in turn should be evaluated for greater than 65% of the cars weights to be within 1t (STATIC TOLERANCE MULTIPLIER (Approx. .2%). Though more than 65% of the cars may be outside of the 1t on any single run, the average run should have less than 35% outside of 1t. (Refer to H-44 for a complete tolerance structure).

IT IS RECOMMENDED THAT ON BI-DIRECTIONAL SYSTEMS, A SINGLE DIRECTION BE TESTED AT A TIME. THIS IMPROVES BOTH TRAIN HANDLING AND THE READABILITY OF THE TEST DATA.

The system may be re-calibrated through the runs as required, however, under normal operating practices, the test procedure will begin again on any adjustments to the weighing system.

6. On completion of the primary direction calibration of the motion weighing system, the secondary direction should be calibrated. This would be accomplished using the same outline detailed in Sections 1 through 5 listed under this MOTION CALIBRATION PROCEDURE.

CONDITIONS AFFECTING MOTION WEIGHING ACCURACY

SPEED

A constant train speed should be maintained throughout the weighing process. Though the weighing system has routines built in to monitor and to adjust the timing logic for train speed, a certain degradation in accuracy is to be expected when the train speed changes. For all motion runs, the train should be positioned at least 75 ft. ahead of the scale or back far enough to accelerate and reach the desired weighing speed before reaching the weighing platform. At this point, the train should be allowed to "ease" across the scale maintaining constant train speed. A certain number of runs might be required to familiarize the engineer with this procedure.

BRAKING

During all motion tests, the air brakes should be bled on all railroad cars. Brake shoes dragging against the wheels will cause a degradation in weight and should be eliminated, when possible.
Use of the air brakes on the engine during the weighing should be avoided, when possible. Use of the dynamic brakes on the engine during the weighing process should be avoided as coupler transfers of weight can be expected when a coupler goes from tension into compression.

BAD WEIGHERS

Often skewed trucks, flat wheels, or poor bearings may cause a car to weigh erratically. This condition is difficult to avoid and when present, the car should be removed from the test as called out in the AAR guidelines for coupled-in-motion railroad scale testing.

FIRST CAR

On coupled-in-motion systems, cars next to the engine will often weigh erratically due to the height and alignment of couplers on locomotives. This problem is somewhat unavoidable and when present, common procedure is to place an idler or buffer car between the engine and the test train and/or to place a heavier car next to the engine to increase the acceptable tolerance for test results on this car.

TRACK

Track conditions leading up to and at the weighbridge itself may cause erratic results. Especially critical is the alignment of the scale rails on the concrete approach slabs. Also, sharp dips or rises in the approach track at and immediately beyond the edge of the 75 ft. concrete slab (3 car lengths) can cause transfers in weight. All newly tamped track can be expected to settle and these approaches should be monitored for a number of months after the construction of a new scale. With time, these approaches will stabilize and need only occasional resurfacing.

BINDS

Rail gaps should be carefully monitored to prevent rail binds. Also, any rail batter at the rail gaps should be corrected during routine maintenance. Flexure plates and check rod alignment and tightness should be checked along with all other mechanical fasteners on the weighing system to prevent movement that would also cause degradation in the weighing accuracy.

For additional information on a specific application or situation, contact the Sales, Engineering or Service Department:

Systems Associates, Inc.
1932 Industrial Drive
Libertyville, IL 60048

MODEL 7425 MOTION WEIGHING SYSTEM
BILL OF MATERIALS

MAIN INSTRUMENT

QUA.	P/N	DESCRIPTION
1	1707000	INSTRUMENT ENCLOSURE
1	2701455	CABLE ADAPTOR BOARD
1	2702300	DATA PROCESSOR BOARD
1	2702400	SYSTEM STATUS INDICATOR BOARD
1	2702500	WEIGHT DISPLAY BOARD
1	2702570	TALKER LOGIC BOARD
1	2702600	SERIAL IO LOGIC
1	2702620	TRACK LOGIC BOARD
1	2702650	525R DATA LOGIC
1	2702470	48K MEMORY BOARD
1	8400112	TERMINAL BARRIER
1	8510009	SPECIAL 9 PIN RIBBON CABLE
1	8510013	SPECIAL RIBBON CABLE ASSEMBLY
1	8550701	LOAD CELL CONNECTOR (7 PIN PANEL)
1	8550702	LOAD CELL CONNECTOR (7 PIN MALE)
2	8712011	MOMENTARY PUSHBUTTONS
4	8713000	MOMENTARY SWITCH
4	8713009	MOMENTARY SWITCH INSERT
1	8714120	KEY SWITCH OPERATOR
1	8790010	RFI POWER FILTER
1	8905525	MODEL 525 WEIGHT INDICATOR
1	8953105	POWER SUPPLY 5 VOLTS 3 AMPS
1	9000040	POWER CORD
1	9000127	FUSE HOLDER (PANEL TYPE)
1	9000310	FUSE 1AMP SLOW BLOW TYPE

MODEL 7425 MOTION WEIGHING SYSTEM
BILL OF MATERIALS

Continued

TRACK SWITCH AMPLIFIERS

QUA.	P/N	DESCRIPTION
1	2200203	TRACK SWITCH CABLE
1	2702556	RAIL LOOP TERMINAL BOARD
1	8510013	RIBBON CABLE ASSEMBLY
1	8612240	SOLID STATE RELAY
6	8907010	RAIL LOOP AMPLIFIER
1	9000040	POWER CORD
1	9301052	INSTRUMENT ENCLOSURE

ADDITIONAL EQUIPMENT

2	1100430	RAIL LOOP (SINGLE)
2	1101360	RAIL LOOP (SINGLE)
1	1101470	RAIL LOOP (DUAL)
1	2104287	MODEM DATA CABLE
1	2106050	DATA CABLE
1	8790100	AC SURGE PROTECTOR
1	8900120	MODEL SAI 120 PRINTER
2	8900606	DIAL-UP MODEM
1	2106053	TALKER CABLE
1	2107080	TALKER ASSEMBLY
1	9990200	POWER DISTRIBUTION STRIP

MODEL 7425 MOTION WEIGHING SYSTEM
SPARE PARTS LIST

QUA.	P/N	DESCRIPTION
4	1101360	RAIL LOOP (SINGLE)
1	1101470	RAIL LOOP (DUAL)
1	2702300	DATA PROCESSOR BOARD W/PROGRAMMING
1	2702400	SYSTEM STATUS INDICATOR
1	2702500	WEIGHT DISPLAY BOARD
1	2702570	TALKER CONTROL LOGIC
1	2702600	SERIAL IO LOGIC
1	2702620	TRACK LOGIC BOARD
1	2702650	525R DATA LOGIC
1	2702470	48K MEMORY BOARD
1	8790002	LCP SURGE SUPPRESSOR
1	8900190	SAI 190 PRINTER W/CABLE
1	8905525	MODEL 525 WEIGHT INDICATOR
4	8907030	RAIL LOOP AMPLIFIER
1	8953105	POWER SUPPLY 5 VOLTS 3 AMPS

SAI 120 PRINTER PARAMETERS

DIP SWITCH SW1 ON SERIAL OPTION IS SET UP AS FOLLOWS:

SWITCH NO.	POSITION	SWITCH NO.	POSITION
1	ON	5	OFF
2	ON	6	OFF
3	OFF	7	OFF
4	OFF	8	OFF

DIP SWITCH SW2 ON SERIAL OPTION IS SET UP AS FOLLOWS:

FUNCTION	**POSITION**							
	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
BAUD RATE 9600	OFF	OFF	OFF	-	-	-	-	-
BAUD RATE 4800	ON	OFF	OFF	-	-	-	-	-
BAUD RATE 2400	OFF	ON	OFF	-	-	-	-	-
BAUD RATE 1200	ON	ON	OFF	-	-	-	-	-
BAUD RATE 600	OFF	OFF	ON	-	-	-	-	-
BAUD RATE 300	ON	OFF	ON	-	-	-	-	-
BAUD RATE 110	OFF	ON	ON	-	-	-	-	-
HANDSHAKE DTR	-	-	-	OFF	-	-	-	-
HANDSHAKE X-ON/X-OFF	-	-	-	ON	-	-	-	-
DATA BIT 7	-	-	-	-	ON	-	-	-
DATA BIT 8	-	-	-	-	OFF	-	-	-
PARITY BIT YES	-	-	-	-	-	ON	-	-
PARITY BIT NONE	-	-	-	-	-	OFF	-	-
PARITY ODD	-	-	-	-	-	-	ON	-
PARITY EVEN	-	-	-	-	-	-	OFF	-

The highlighted selections are the original system settings.

MODEM ASSEMBLY PARAMETERS

DIP SWITCH SETTINGS

NO.	SW. POSITION		FUNCTIONS
1	UP	.....	DTR FORCED ON AT ALL TIMES
	DOWN	.....	DTR DEPENDENT ON INTERFACE
2	**UP**	.....	RESPONDS TO ENGLISH WORD
	DOWN	.....	RESPONDS TO DIGIT
3	UP	.....	SUPPRESS COMMAND RESPONSES
	DOWN	.....	ENABLE COMMAND RESPONSES
4	UP	.....	ENABLE COMMAND CHARACTER ECHO
	DOWN	.....	DISABLE COMMAND CHARACTER ECHO
5	**UP**	.....	ENABLE AUTOMATIC ANSWER
	DOWN	.....	DISABLE AUTOMATIC ANSWER
6	**UP**	.....	CARRIER DETECT (CD) FUNCTION NORMALLY
	DOWN	.....	CARRIER DETECT (CD) ALWAYS
7	UP	.....	FACTORY TEST MODE ENABLE
	DOWN	..... (FACTORY SETTINGS)	FACTORY TEST MODE DISABLE
8	UP	.....	FACTORY TEST MODE ENABLE
	DOWN	.....	FACTORY TEST MODE DISABLE (FACTORY SETTINGS)

The highlighted selections are the original system settings

Model 525 Parameters

Serial No.: 7425-1840

INDICATOR CONFIGURATION

A.	Operating Voltage:	117V AC
B.	Excitation:	12 Volts
C.	Software Version:	SAI v7r0
D.	Options:	None

Indicator Setup Parameters

Check or fill in the appropriate values:

A.	Legal Regulation:	Industrial
B.	Capacity:	400,000
C.	Display Divisions:	20
D.	Frequency:	60 Hz
E.	Analog Filter:	2 Hz
F.	Digital Filter:	1
G.	Motion Band:	3
H.	Motion Delay:	1
I.	Motion Blank:	No Blank
J.	Zero Range:	Full Scale
K.	Zero Track:	0
L.	Overload Limit:	Full Scale +2%
M.	Decimal Point:	Dot
N.	B or G Annunciator:	G
O.	Units:	LB
P.	Date Format:	MMDDY4
Q.	Date Separators:	Slash
R.	Time Separators:	Colon
S.	Printer Minimum:	0
T.	Power Up Type:	GO
U.	Tare Option:	Normal
V.	Tare In Motion:	Off
W.	Keyboard Lock Out:	Off
X.	Print Lock Out:	Off
Y.	Tare Lock Out:	Off
Z.	Zero Lock Out:	Off

Serial Outputs (Record Information if Required)

A.	Port #1 Setup:	RS232
B.	Port #2 Setup:	RS232
C.	Port Select:	E1 - P2

Printer Port Setup: (Record Information if Required)

A. Format

Field 1: _____	Blanks: _____	CR: _____
Field 2: _____	Blanks: _____	CR: _____
Field 3: _____	Blanks: _____	CR: _____
Field 4: _____	Blanks: _____	CR: _____
Field 5: _____	Blanks: _____	CR: _____
Field 6: _____	Blanks: _____	CR: _____
Field 7: _____	Blanks: _____	CR: _____
Field 8: _____	Blanks: _____	CR: _____

B:	Line Feed:	_____
C.	Baud Rate:	_____
D.	Parity:	_____
E.	Handshake:	_____
F.	Delay:	_____

EDP Port Setup:

A.	Format:	CC
B.	Line Feed:	No
C.	Baud Rate:	9600
D.	Parity:	None
E.	Address:	0
F.	Delay:	0

Set Point Option Setup (Record Information if Required)

Check or fill in the appropriate values:

Setpoint 1:_____	Mode:_____	Action:_____	Hysteresis:_____
Setpoint 2:_____	Mode:_____	Action:_____	Hysteresis:_____
Setpoint 3:_____	Mode:_____	Action:_____	Hysteresis:_____
Setpoint 4:_____	Mode:_____	Action:_____	Hysteresis:_____
Setpoint 5:_____	Mode:_____	Action:_____	Hysteresis:_____
Setpoint 6:_____	Mode:_____	Action:_____	Hysteresis:_____
Setpoint 7:_____	Mode:_____	Action:_____	Hysteresis:_____
Setpoint 8:_____	Mode:_____	Action:_____	Hysteresis:_____

Analog Output Options (Record information if required)

A.	Offset:	_____
B.	Tracking:	_____
C.	Error Action:	_____

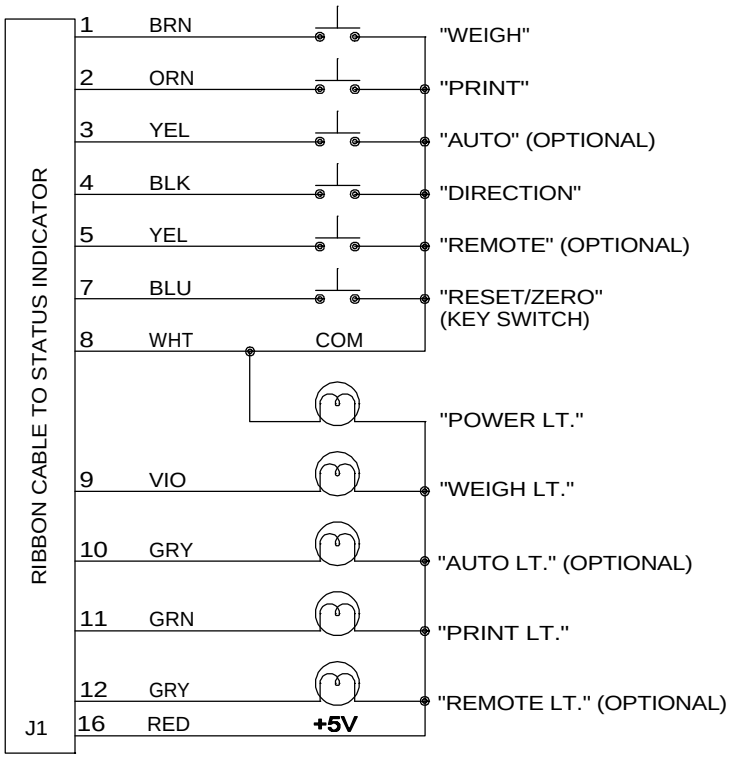
MODEL 7425 MOTION WEIGHING SYSTEM

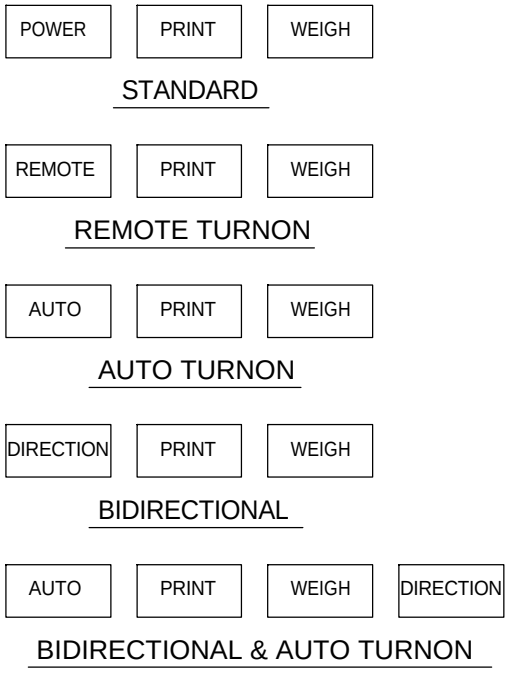
TRACK LOGIC BOARD
DIP SWITCH #1

FUNCTION	POSITION							
	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
NO DIRECTION	OPEN	OPEN	-	-	-	-	-	-
NORTH/SOUTH	CLOSED	OPEN	-	-	-	-	-	-
EAST/WEST	OPEN	CLOSED	-	-	-	-	-	-
IN/OUT	CLOSED	CLOSED	-	-	-	-	-	-
DIRECTION NORMAL	-	-	OPEN	-	-	-	-	-
DIRECTION REVERSE	-	-	CLOSED	-	-	-	-	-
CALIB. CHECK DISABLE	-	-	-	OPEN	-	-	-	-
CALIB. CHECK ENABLE	-	-	-	CLOSED	-	-	-	-
CLOCK	-	-	-	-	OPEN	-	-	-
ETS/CTS/MPH	-	-	-	-	CLOSED	-	-	-
CABOOSE DISABLE	-	-	-	-	-	-	OPEN	-
CABOOSE ENABLE	-	-	-	-	-	-	CLOSED	-
RESYNC DISABLED	-	-	-	-	-	-	-	OPEN
RESYNC ENABLED	-	-	-	-	-	-	-	CLOSED

TRACK LOGIC BOARD
DIP SWITCH #2

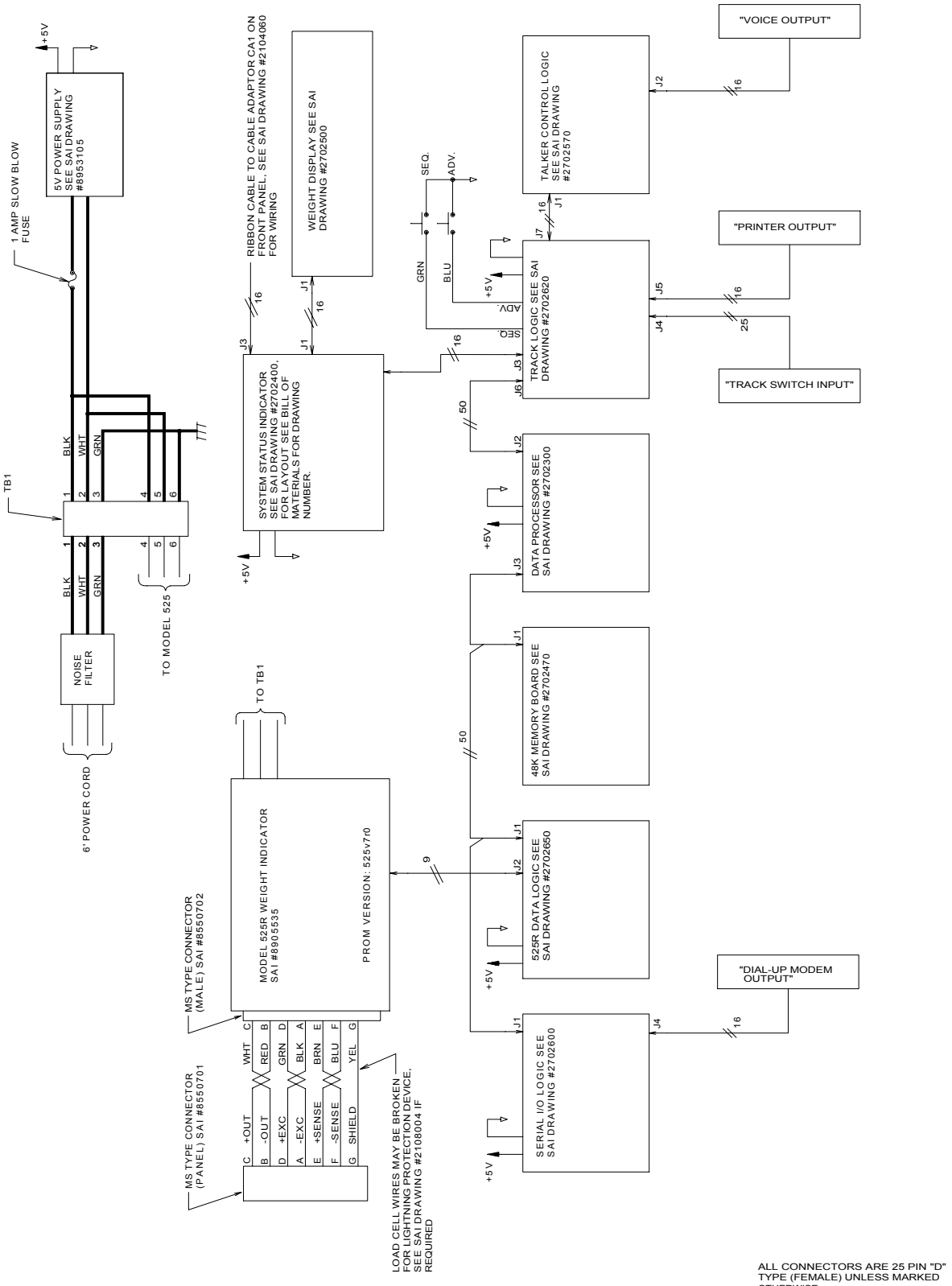
FUNCTION	POSITION							
	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
NO CONVERSIONS PRINTED	-	-	OPEN	-	-	-	-	-
PRINT CONVERSIONS	-	-	CLOSED	-	-	-	-	-
REVERS DISABLE	-	-	-	-	-	-	-	OPEN
REVERSE ENABLE	-	-	-	-	-	-	-	CLOSED



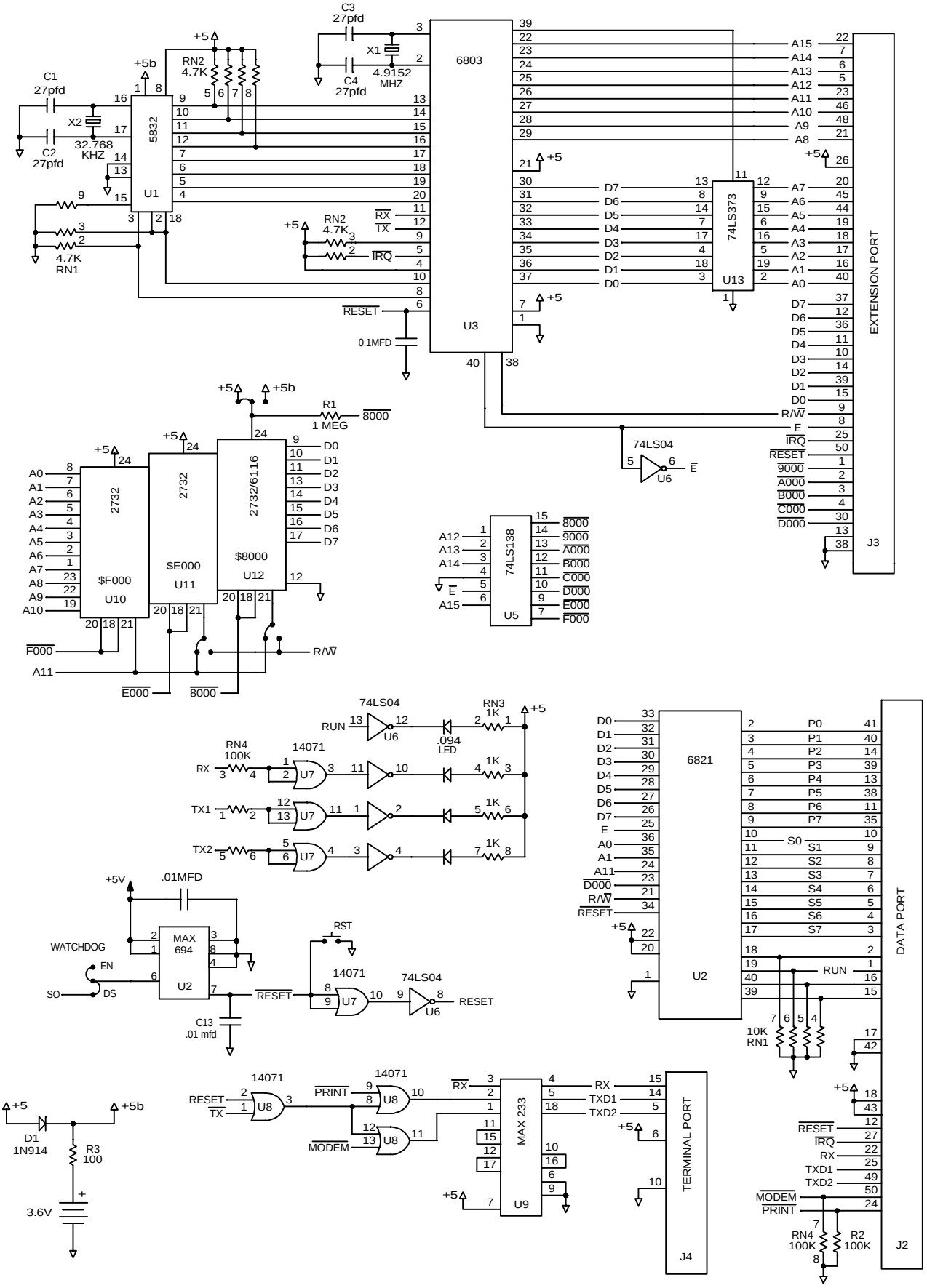


NOTES:

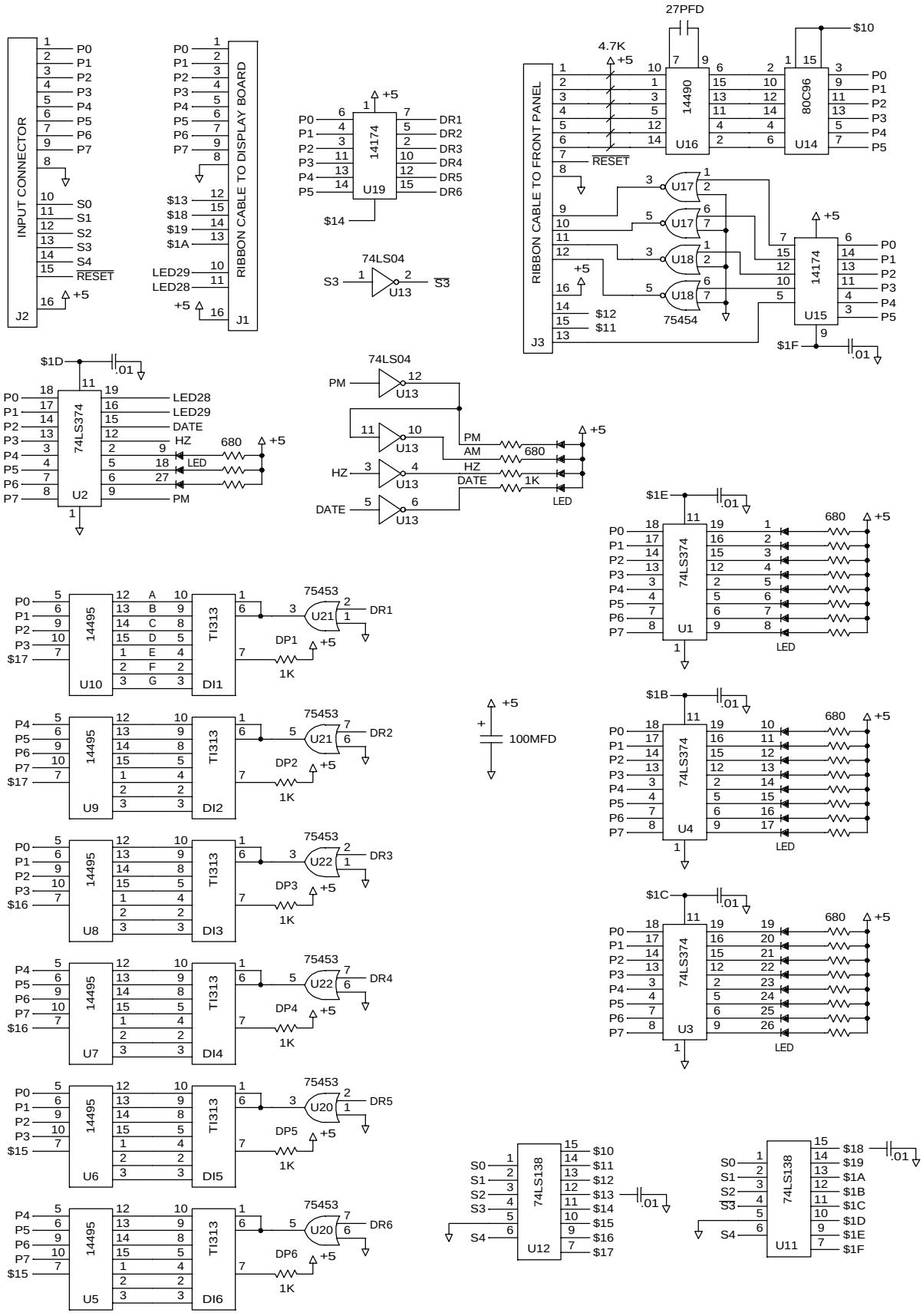
1) SEE SYSTEM LAYOUT, FOR SWITCH LAYOUT
2) INSERT BULB IN SWITCH LABELED POWER IF REQUIRED, OR REMOVE BULB FROM SWITCH LABELED DIRECTION IF REQUIRED



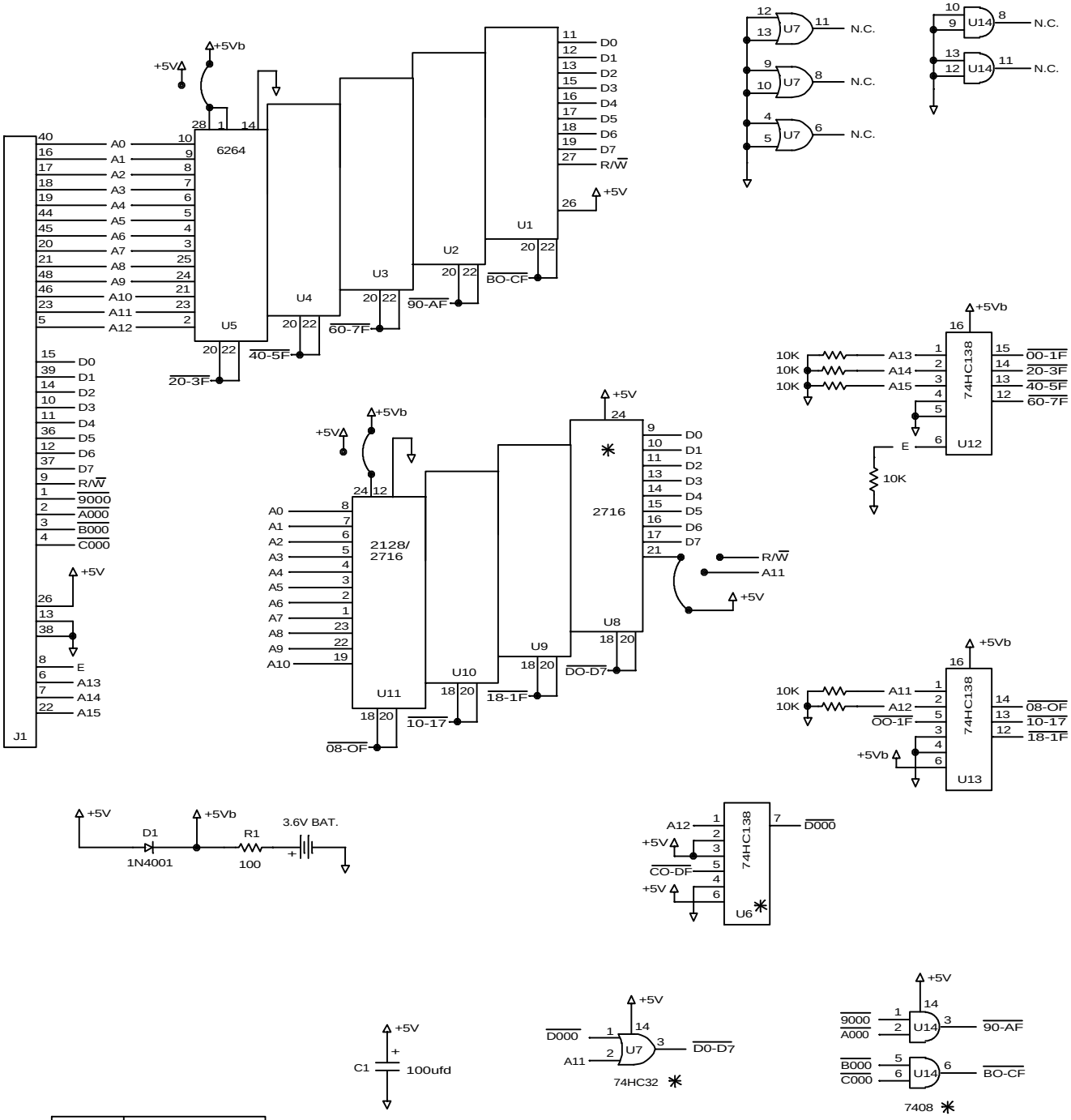
CAD 304	REV		2113271
			INSTRUMENT WIRING



CAD	REV 4 MAY 97		2702300E
			DATA PROCESSOR



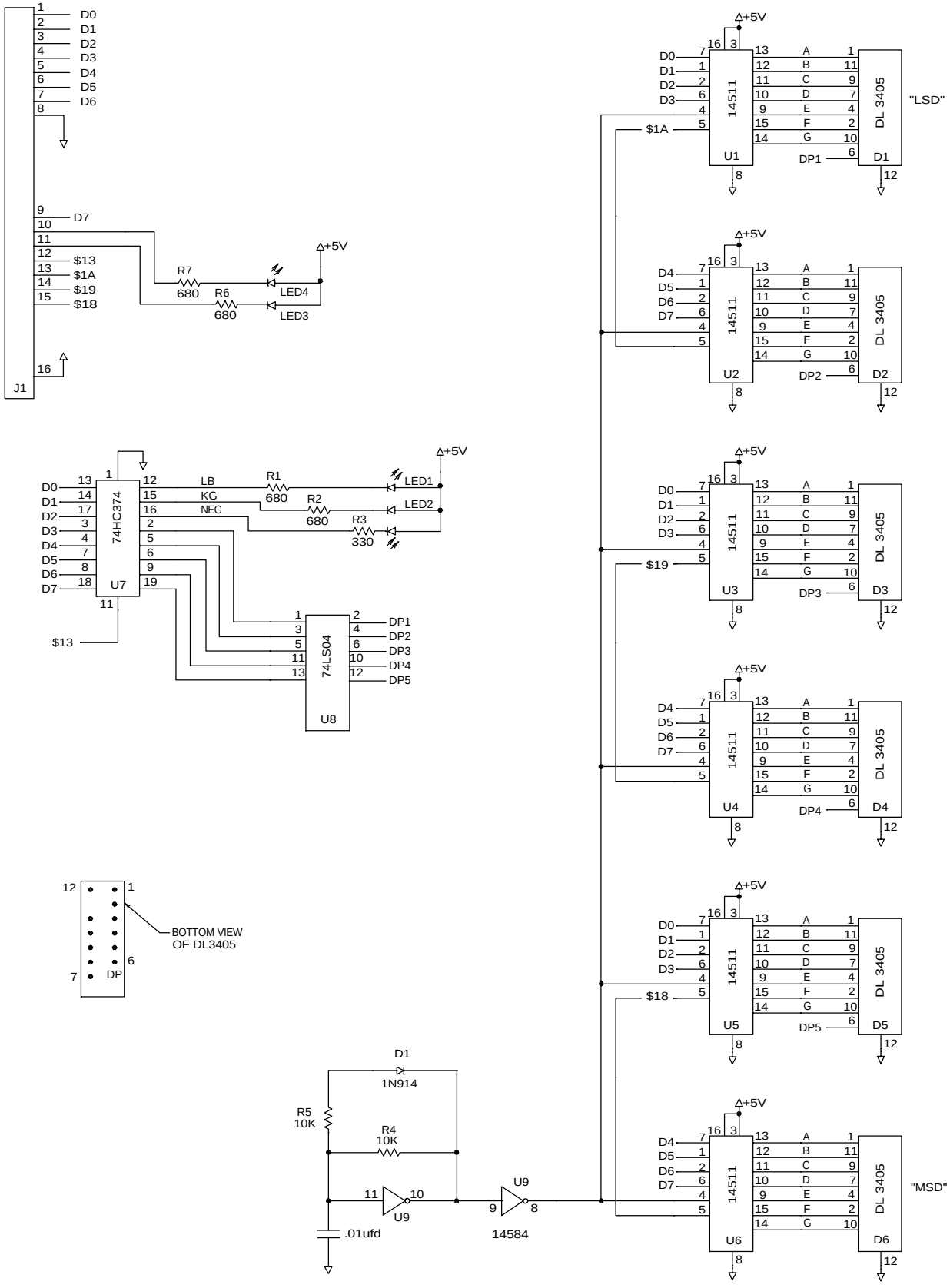
CAD 994	REV 10 OCT 96		2702400
			SYSTEM STATUS INDICATOR



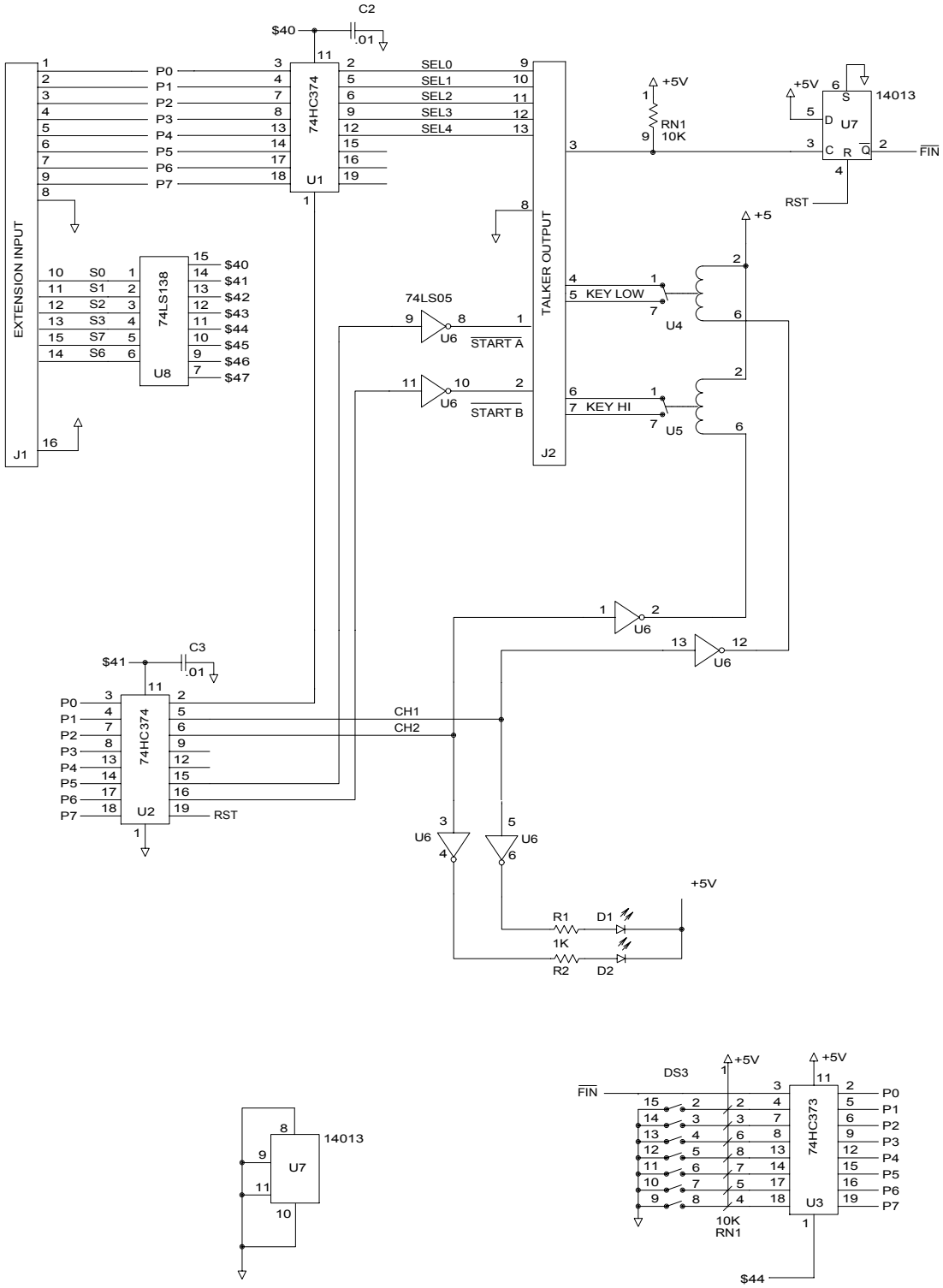
PIN NO.	CHIPS U8-U11	
	RAM	EPROM
24	+5Vb	+5V
21	R/W	+5V

✳ INDICATES OPTIONAL COMPONENTS

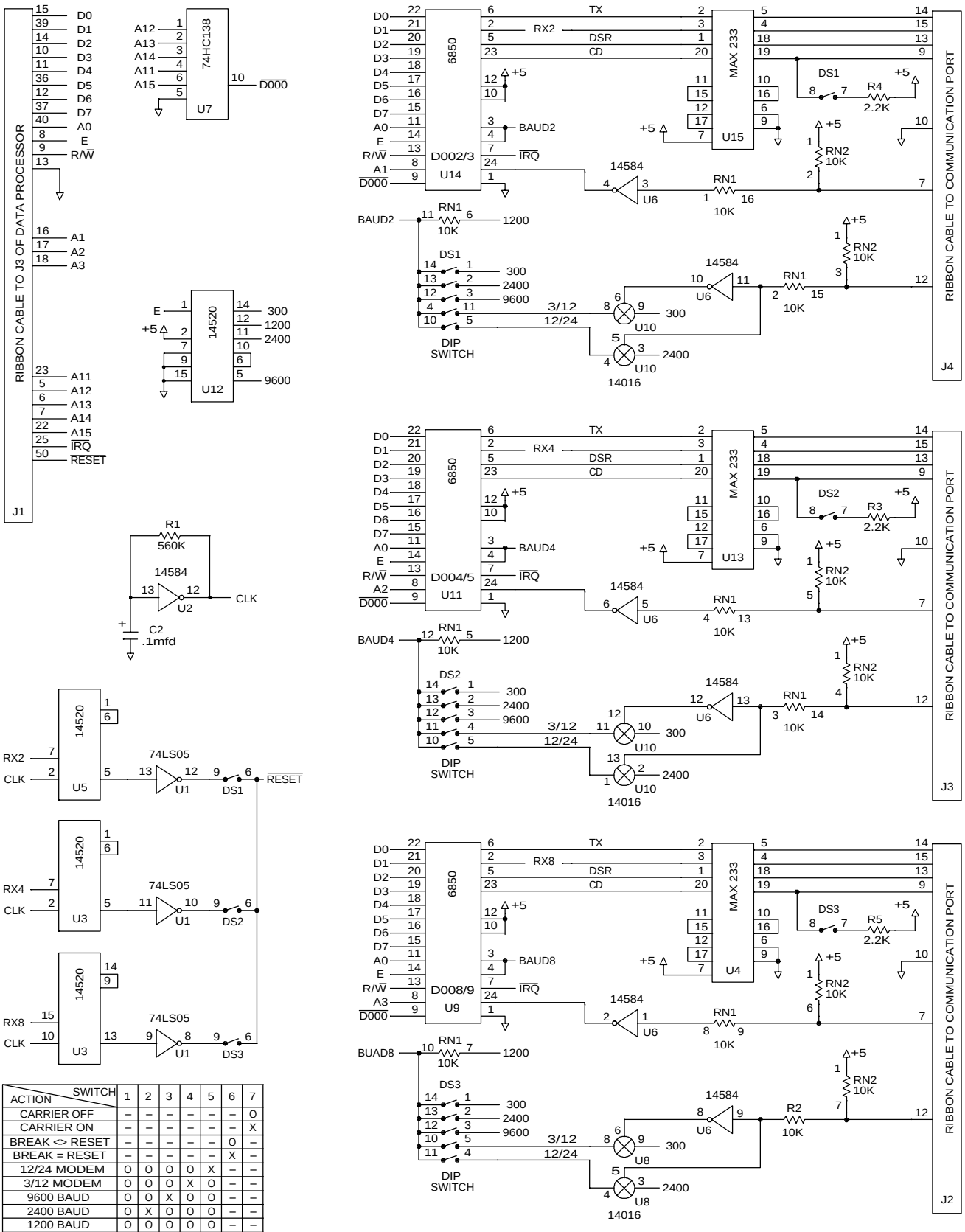
CAD 495	REV 3 FEB 87		2702470
			48K MEMORY BOARD



CAD	395A	REV	22 DEC 86		2702500
					WEIGHT DISPLAY

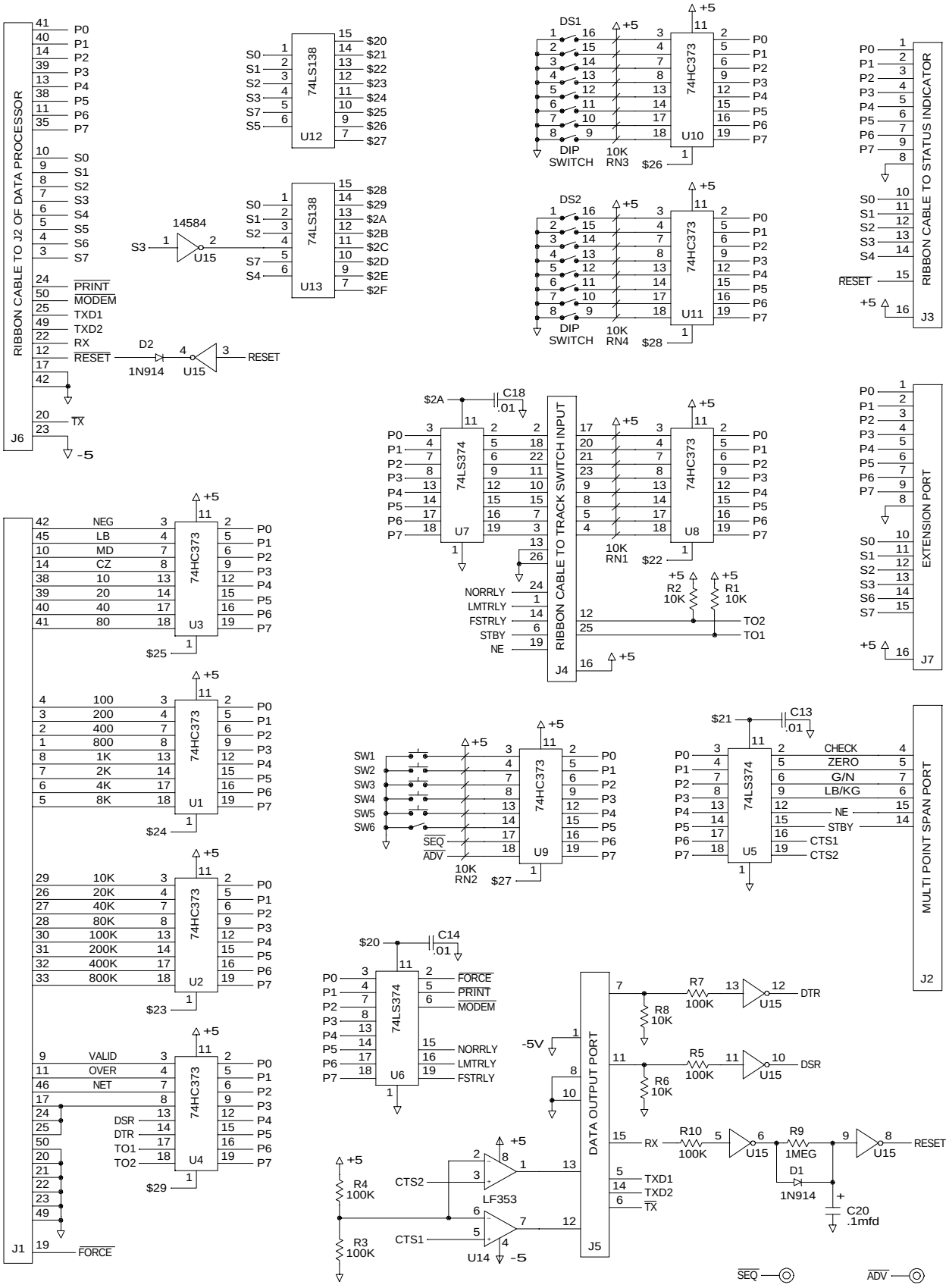


CAD 395A	REV 3 OCT 97		2702570
			TALKER CONTROL LOGIC

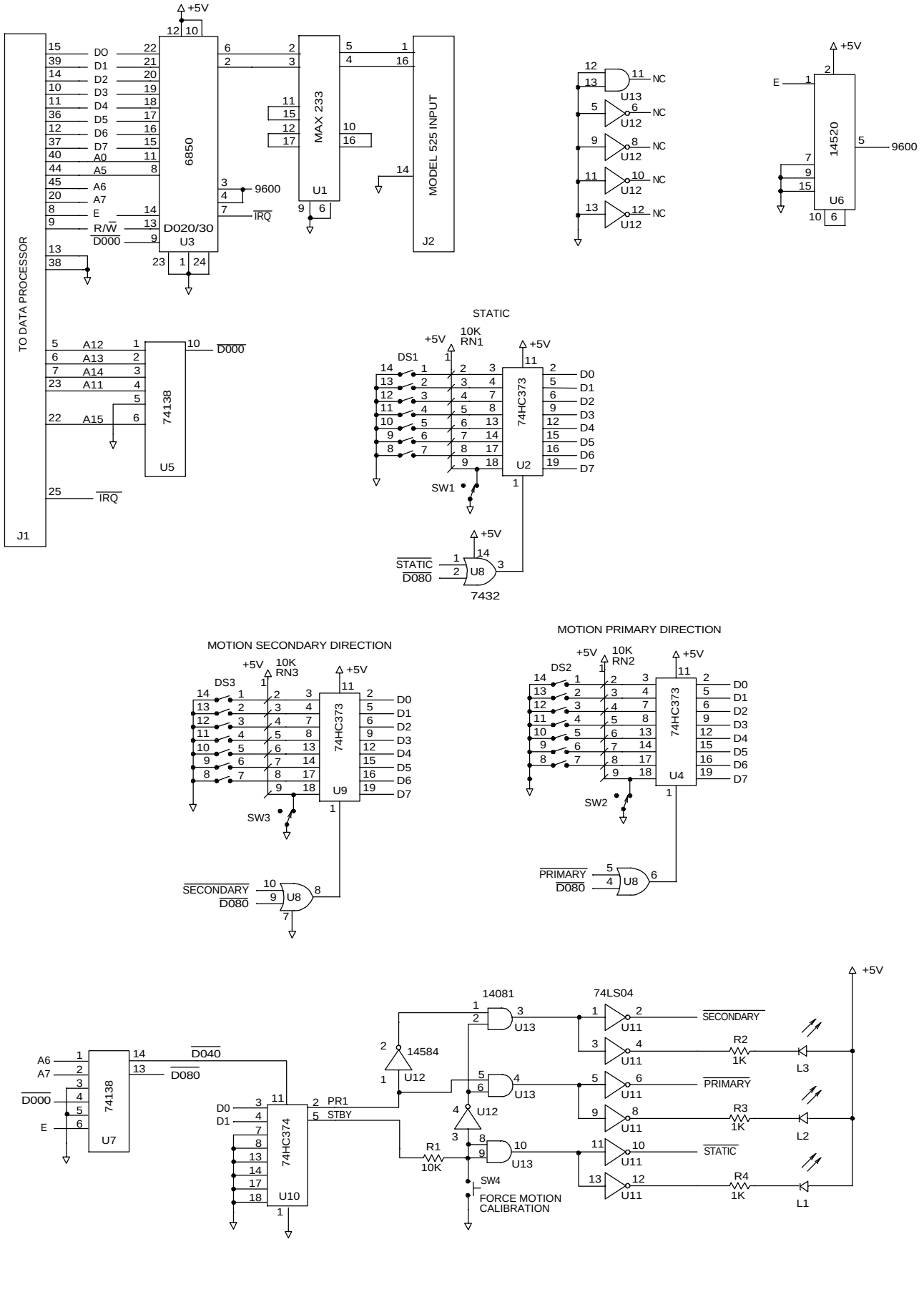


ACTION \ SWITCH	1	2	3	4	5	6	7
CARRIER OFF	–	–	–	–	–	–	O
CARRIER ON	–	–	–	–	–	–	X
BREAK <> RESET	–	–	–	–	–	O	–
BREAK = RESET	–	–	–	–	–	X	–
12/24 MODEM	O	O	O	O	X	–	–
3/12 MODEM	O	O	O	X	O	–	–
9600 BAUD	O	O	X	O	O	–	–
2400 BAUD	O	X	O	O	O	–	–
1200 BAUD	O	O	O	O	O	–	–
300 BAUD	X	O	O	O	O	–	–

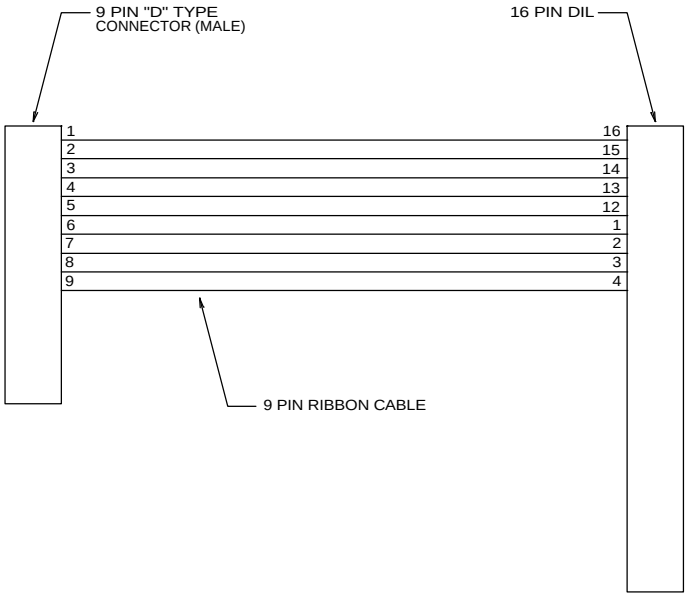
CAD 1194A	REV		2702600
			SERIAL I/O BOARD



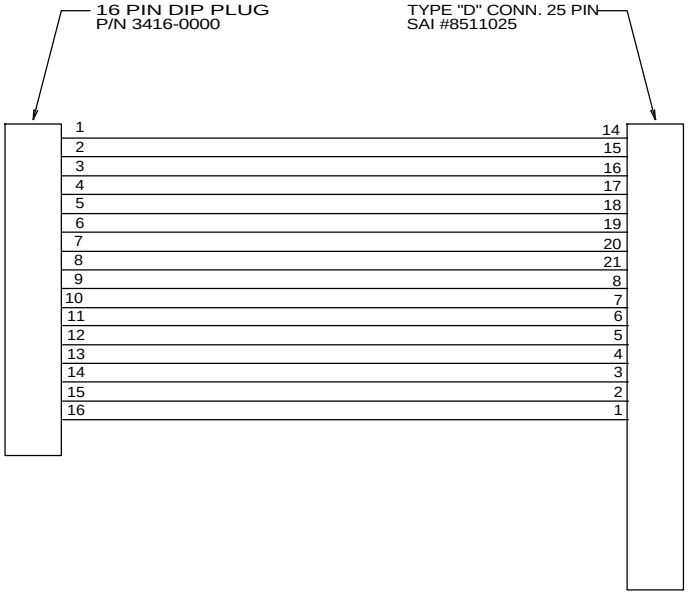
CAD 1294A	REV		2702620
			TRACK LOGIC



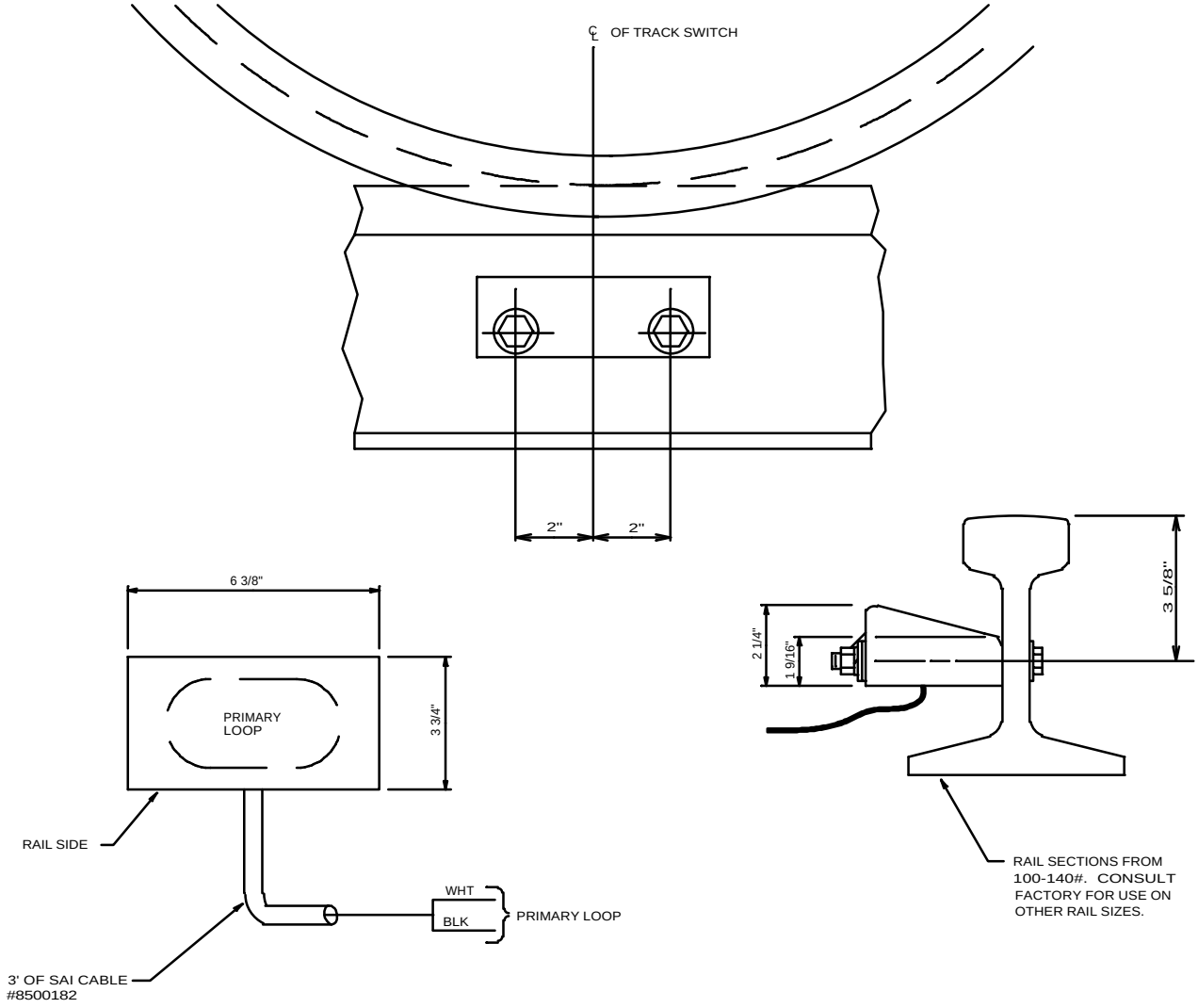
CAD 395A	REV		2702650
			525R DATA LOGIC



CAD 1194A	REV		8510009
9 PIN RIBBON CABLE PIN OUT			



CAD 1194A	REV		8510013
16 PIN RIBBON CABLE PIN OUT			



TOP VIEW

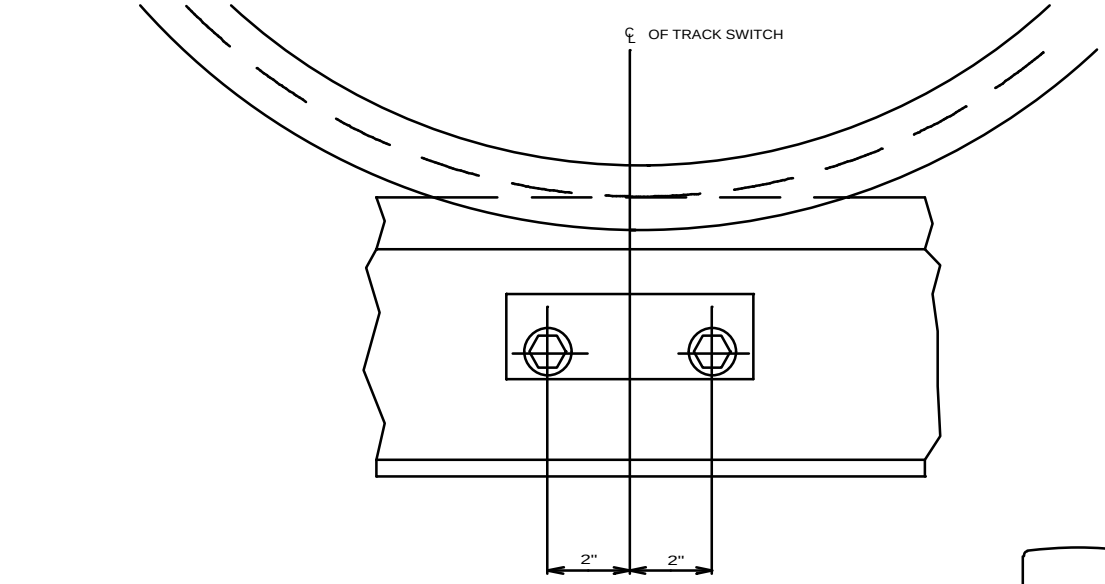
BILL OF MATERIALS

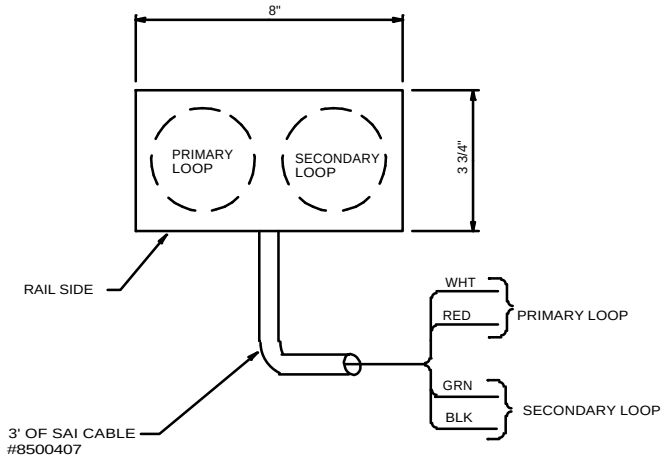
1 - 1101360 TRACK LOOP
2 - 7000800 3/8" - 18 x 5" MAX HEX CAP BOLT
6 - 7002800 3/8" FLAT WASHER
2 - 7002801 3/8" LOCK WASHER
2 - 7004800 3/8" - 18 HEX NUT

NOTES

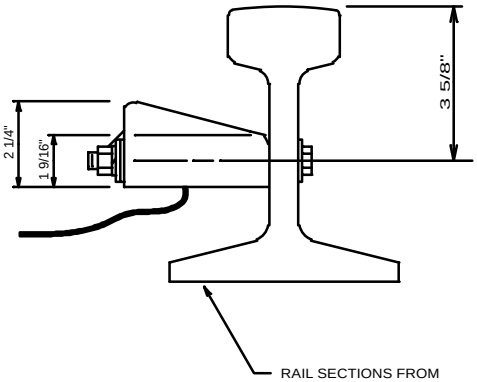
1. 3/6" DIAMETER CORD SHOULD ENTER CONDUIT USING WATERTIGHT CORD GRIP (CG1850 OR EQUIV.).
2. EXPOSED CORD SHOULD BE AS SHORT AS POSSIBLE AND AWAY FROM METAL AND CONCRETE SURFACES.
3. ALL CONNECTIONS SHOULD BE SOLDERED USING ELECTRICAL ROSIN CORE SOLDER
4. ALL CONNECTIONS SHOULD BE TAPED USING GOOD QUALITY BLACK ELECTRICAL TAPE.
5. PLACE BOLTS AS SHOWN IN THE ABOVE DRAWING TO FACILITATE REPLACEMENT OF TRACK SWITCHES WHEN NECESSARY.

CAD 1097	REV 18 JUNE 01		1101360
RAIL LOOP MOUNTING & WIRING DETAILS			





TOP VIEW



BILL OF MATERIALS

1 - 1100470 TRACK LOOP

2 - 7000800 3/8" - 18 X 5" MAX HEX CAP BOLT

6 - 7002800 3/8" FLAT WASHER

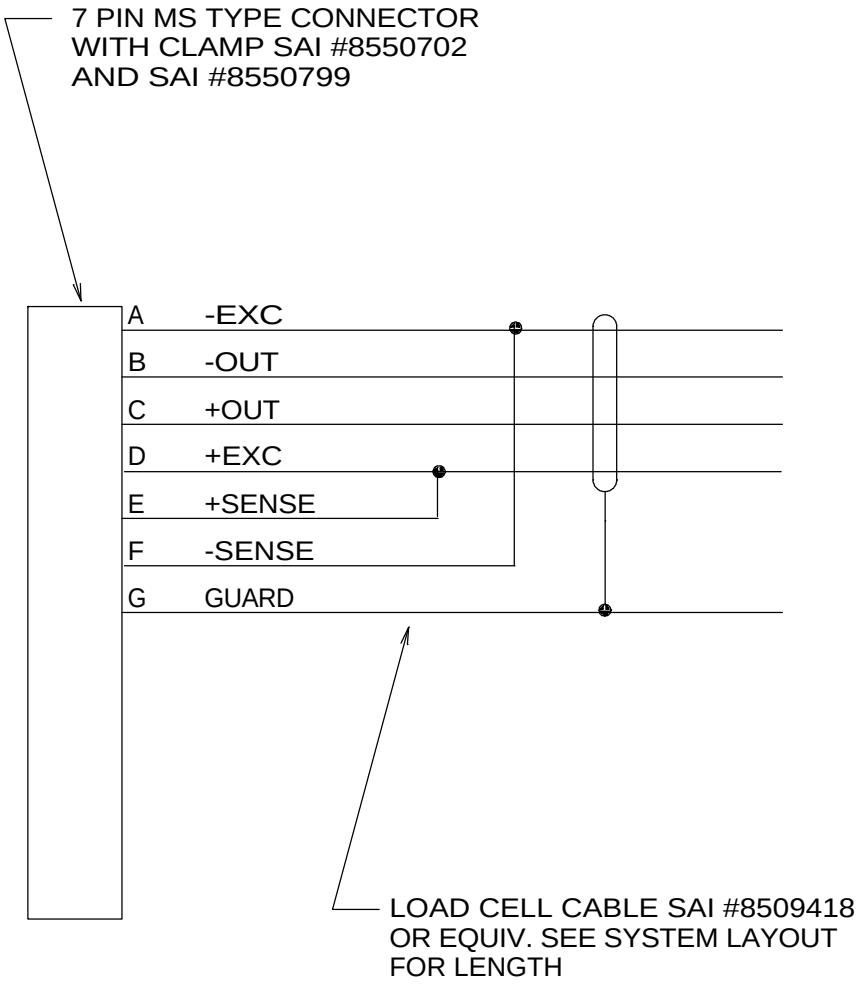
2 - 7002801 3/8" LOCK WASHER

2 - 7004800 3/8"-18 HEX NUT

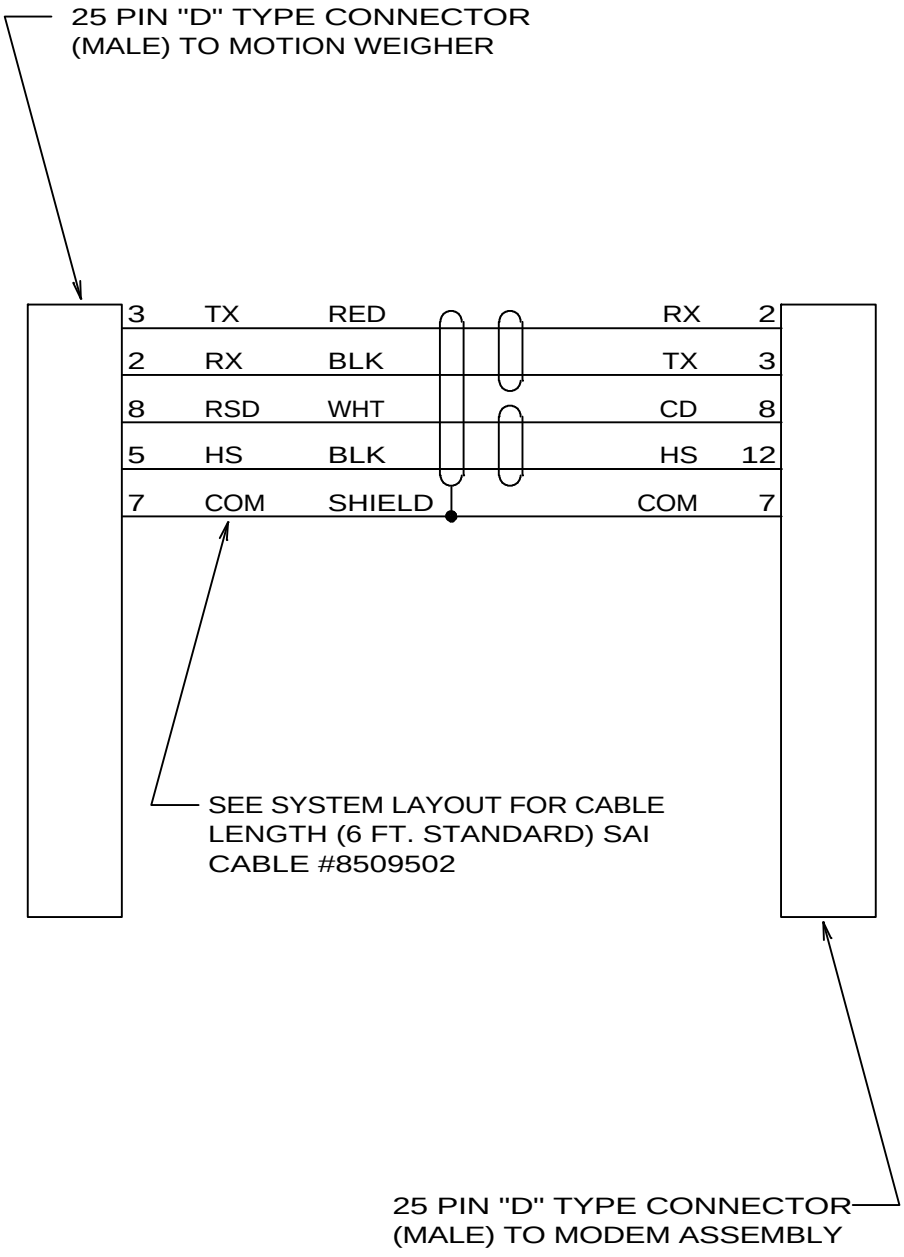
NOTES

1. 3/6" DIAMETER CORD SHOULD ENTER CONDUIT USING WATERTIGHT CORD GRIP (CG2575 OR EQUIV.).
2. EXPOSED CORD SHOULD BE AS SHORT AS POSSIBLE AND AWAY FROM METAL AND CONCRETE SURFACES.
3. ALL CONNECTIONS SHOULD BE SOLDERED USING ELECTRICAL ROSIN CORE SOLDER
4. ALL CONNECTIONS SHOULD BE TAPED USING GOOD QUALITY BLACK ELECTRICAL TAPE.
5. PLACE BOLTS AS SHOWN IN THE ABOVE DRAWING TO FACILITATE REPLACEMENT OF TRACK SWITCHES WHEN NECESSARY.

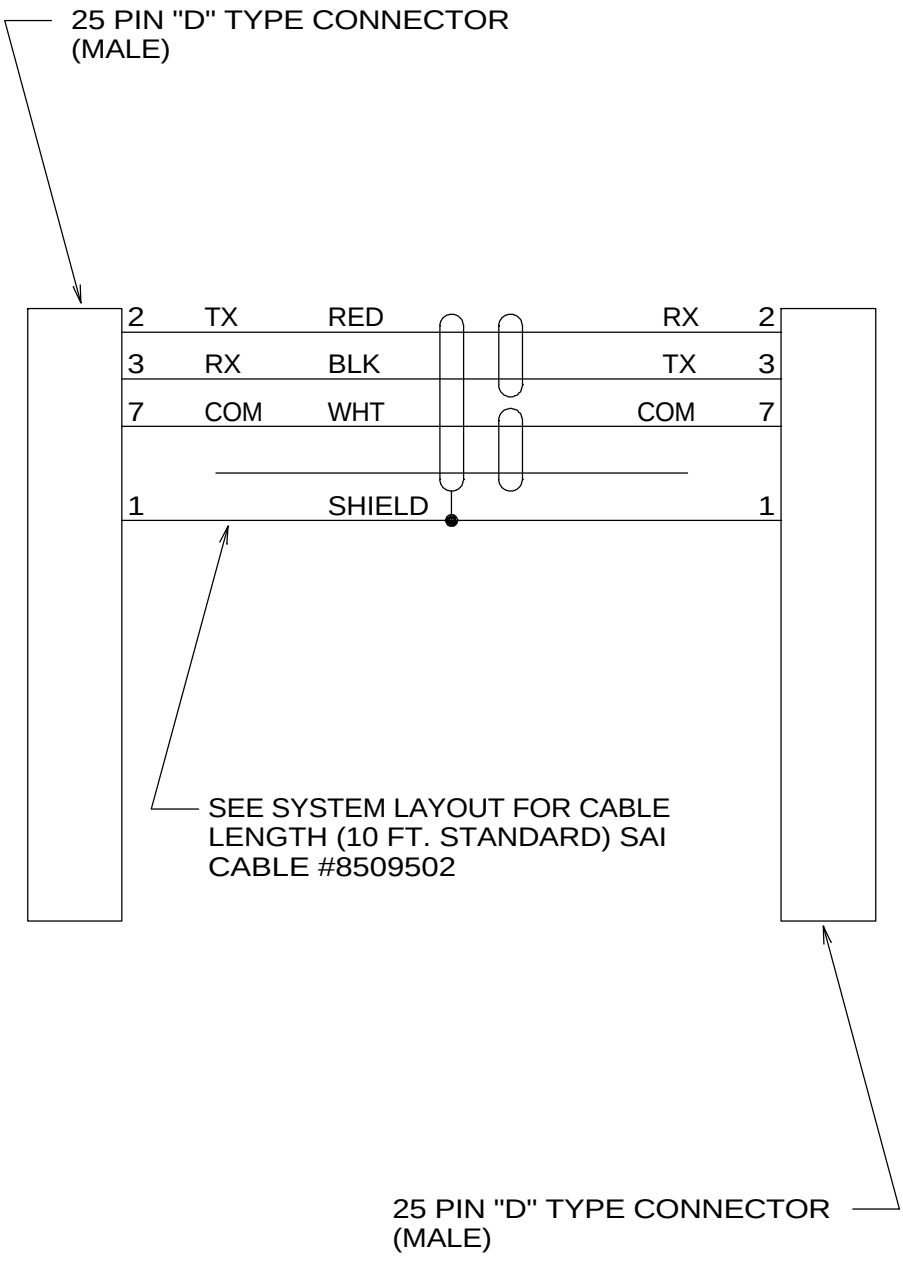
CAD 900	REV 18 JUNE 01	DUAL LOOP	1101470
		RAIL LOOP MOUNTING & WIRING DETAILS	

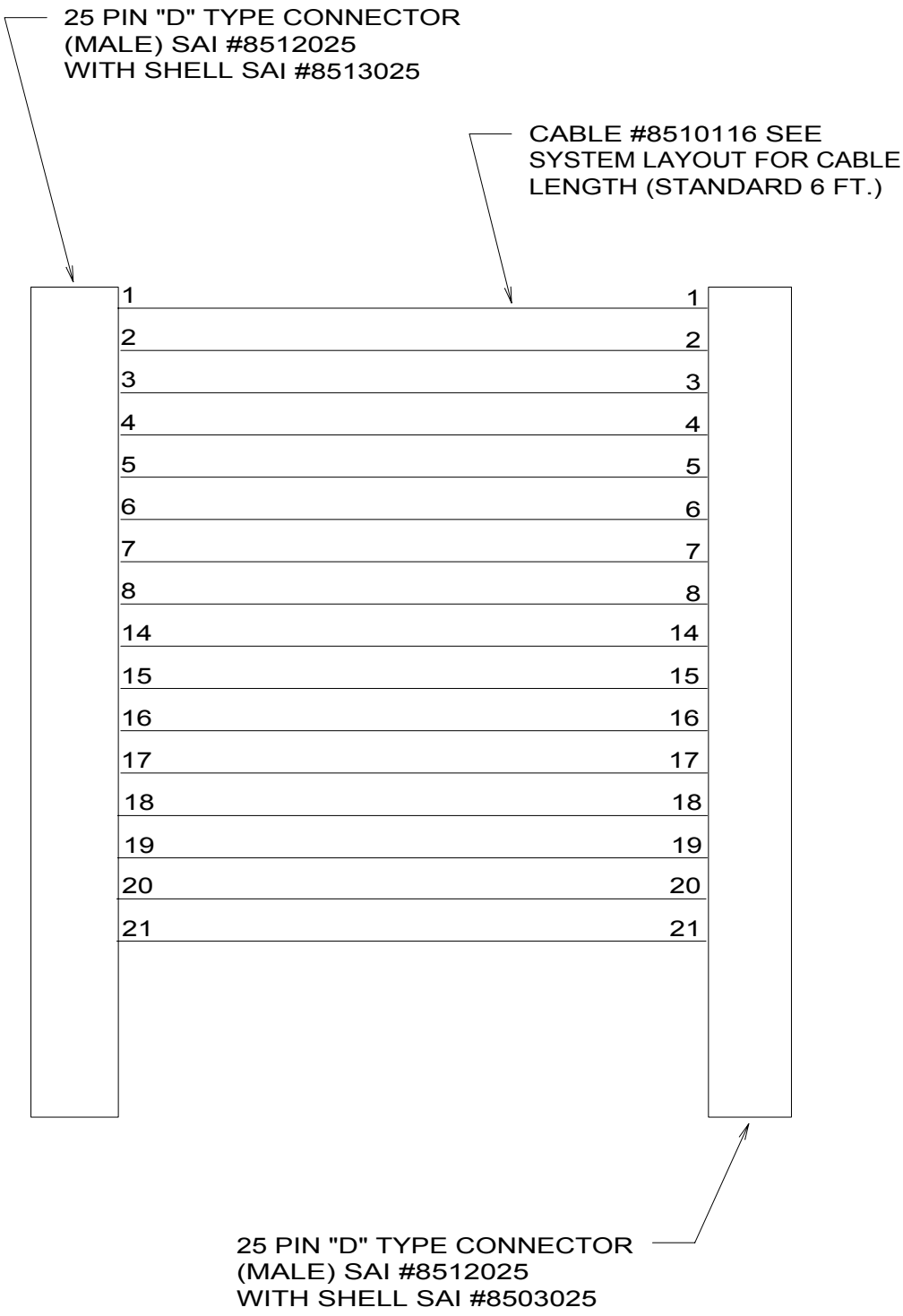


YEL	GUARD	YEL OR ORN
BLK	-EXC	BLK
GRN	+EXC	RED
RED	-OUT	WHT
WHT	+OUT	GRN
EAST COAST	SIGNAL	WEST COAST
COLOR CODE		

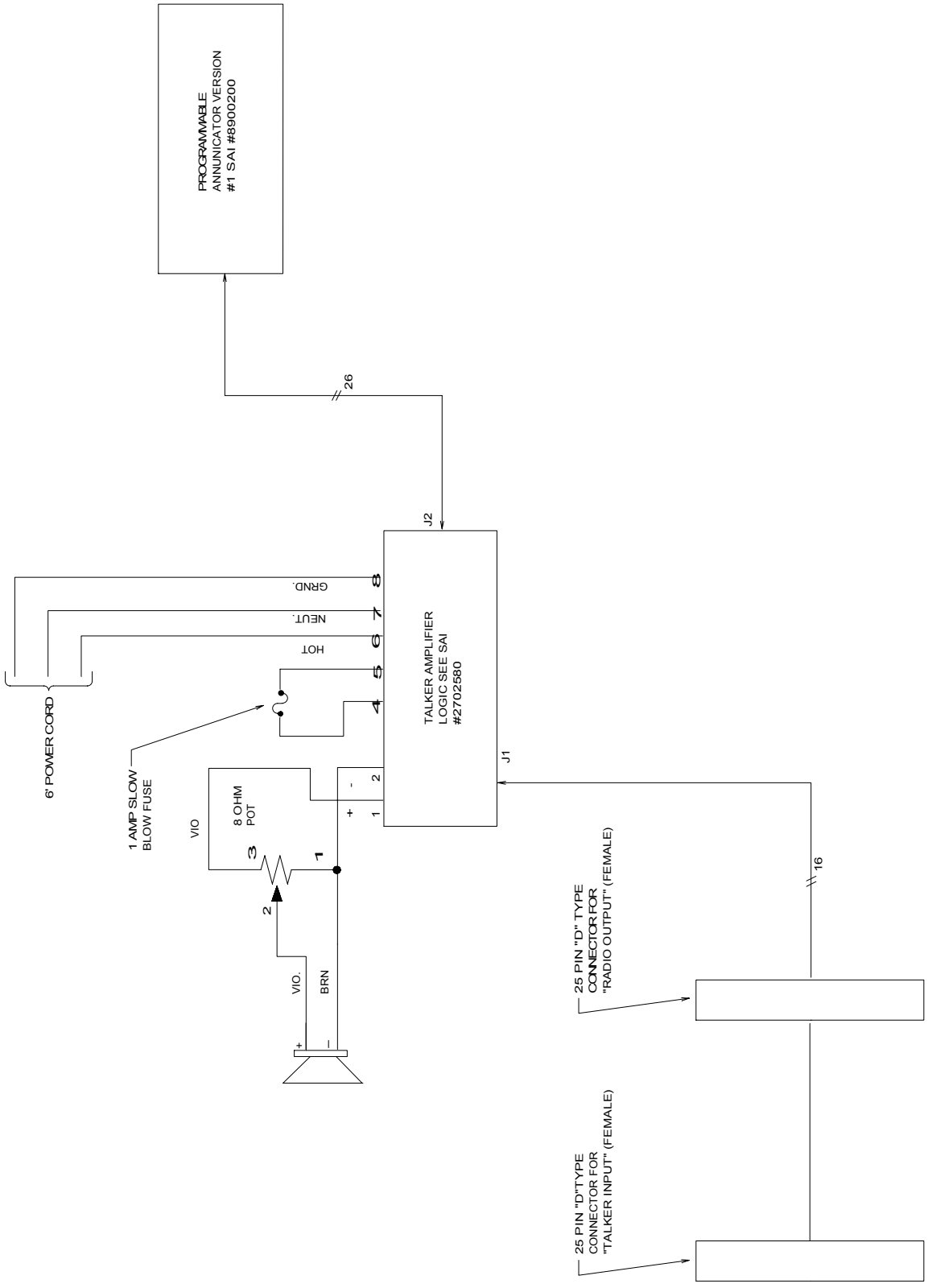


CAD 1194	REV 19 DEC 96		2104287
			DATA CABLE

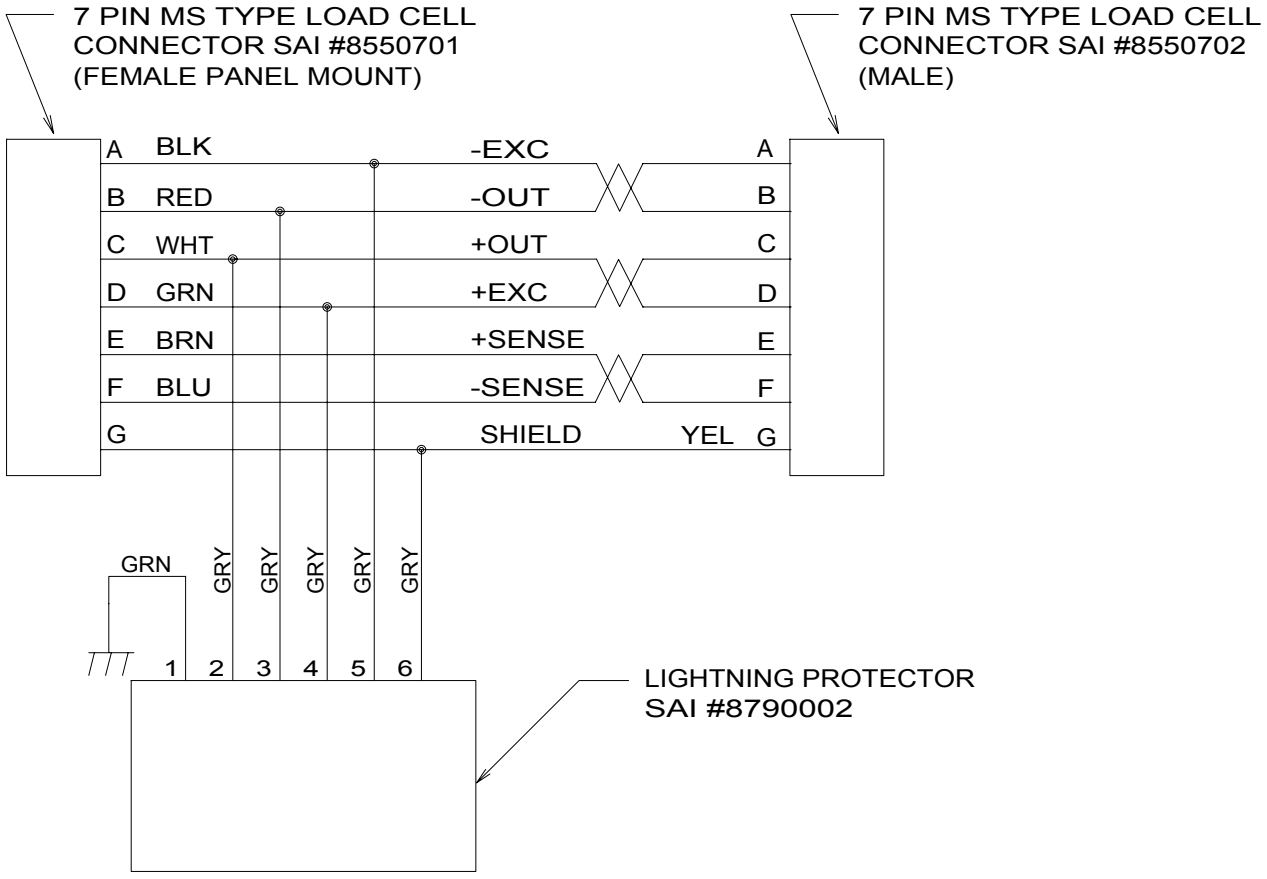

25 PIN "D" TYPE CONNECTOR
(MALE)
2 TX RED RX 2
3 RX BLK TX 3
7 COM WHT COM 7
1 SHIELD 1
SEE SYSTEM LAYOUT FOR CABLE
LENGTH (10 FT. STANDARD) SAI
CABLE #8509502
25 PIN "D" TYPE CONNECTOR
(MALE)



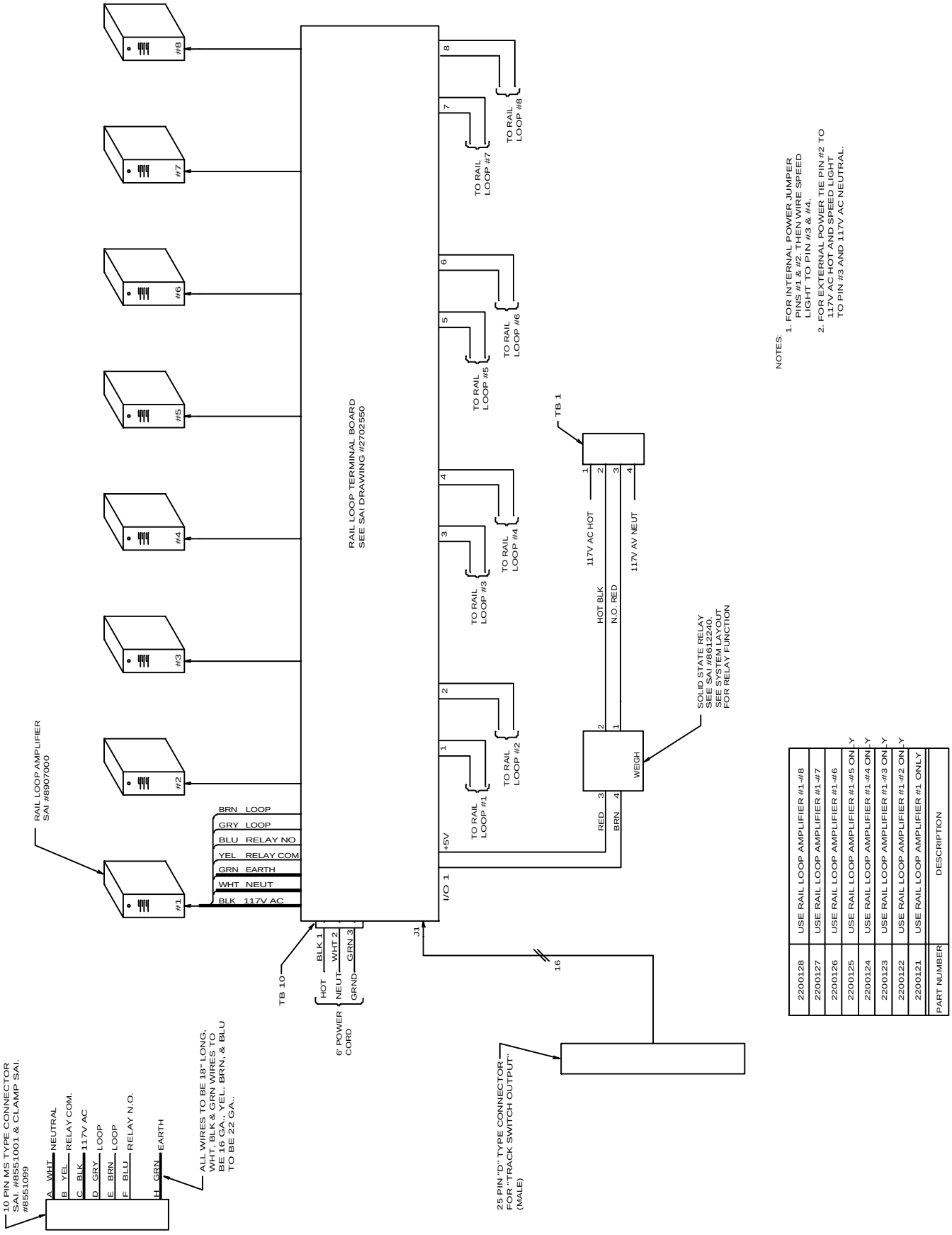
CAD 1294	REV		2106053
			TALKER DATA CABLE



CAD 1294	REV 13 JUN 96		2107080
TALKER ASSEMBLY WIRING			



CAD 295A	REV 28 MAY 02		2108004
LOAD CELL WIRING W/LIGHTING PROTECTOR			

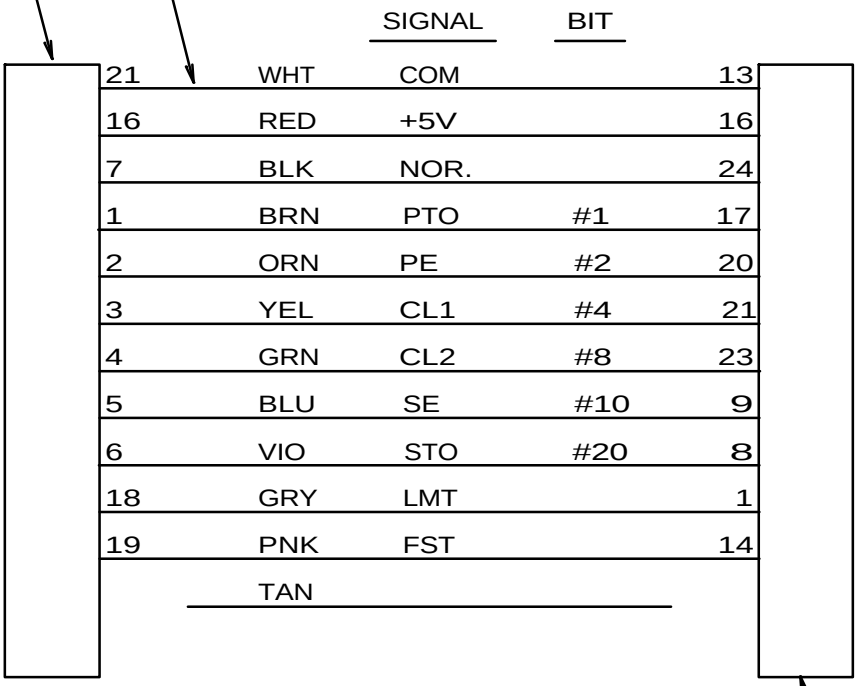


PART NUMBER	DESCRIPTION
2200128	USE RAIL LOOP AMPLIFIER #1-#8
2200127	USE RAIL LOOP AMPLIFIER #1-#7
2200126	USE RAIL LOOP AMPLIFIER #1-#6
2200125	USE RAIL LOOP AMPLIFIER #1-#5 ONLY
2200124	USE RAIL LOOP AMPLIFIER #1-#4 ONLY
2200123	USE RAIL LOOP AMPLIFIER #1-#3 ONLY
2200122	USE RAIL LOOP AMPLIFIER #1-#2 ONLY
2200121	USE RAIL LOOP AMPLIFIER #1 ONLY

CAD 195	REV 25 JULY 90	2200120
TRACK SWITCH AMPLIFIER BOX WIRING		

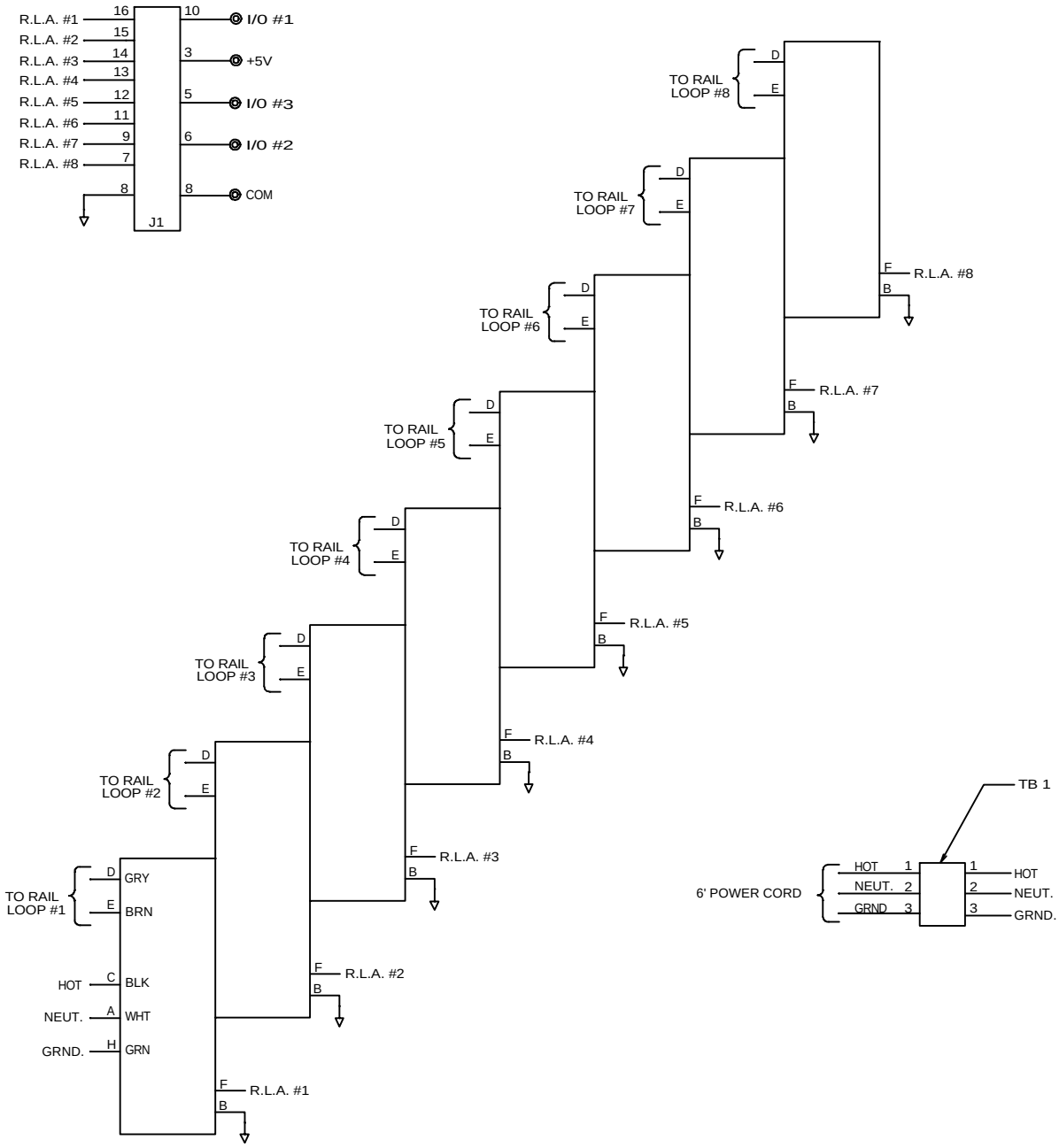
25 PIN "D" TYPE CONNECTOR TO
"TRACK SWITCH OUTPUT" (FEMALE)
ON TRACK SWITCH AMPLIFIER BOX

SAI CABLE #8508202 SEE
SYSTEM LAYOUT FOR CABLE
LENGTH (STANDARD 15 FT.)



		SIGNAL	BIT	
21	WHT	COM		13
16	RED	+5V		16
7	BLK	NOR.		24
1	BRN	PTO	#1	17
2	ORN	PE	#2	20
3	YEL	CL1	#4	21
4	GRN	CL2	#8	23
5	BLU	SE	#10	9
6	VIO	STO	#20	8
18	GRY	LMT		1
19	PNK	FST		14
	TAN			

25 PIN "D" TYPE CONNECTOR TO
"TRACK SWITCH INPUT" (MALE)
ON MOTION WEIGHING SYSTEM



NOTE: PC BOARD P/N LAST DIGIT OF SCHEMATIC NO. WILL BE REPLACED WITH RAIL LOOP CABLE COUNT

CAD 195	REV		2702550
			RAIL LOOP TERMINAL BOARD