REDKOH INDUSTRIES

CAN-TRANSCEIVER OPERATING MANUAL

V1.39

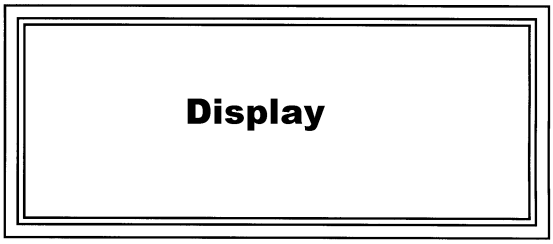
Table of Contents

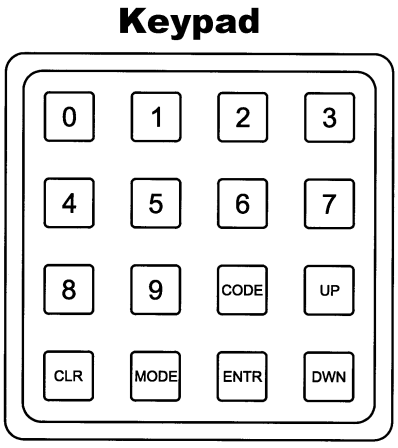
Chapter 1 Introduction

The CAN-Transceiver is used as a gateway between a distributed control system (DCS) and one or more Microprocessor Transformer Rectifier Controls and one or more Microprocessor Rapper Controls. The communications between the CAN-Transceiver and a DCS employs the industry standard MODBUS binary protocol using registers for addressing the data. The communication protocol to the TR control and the rapper control is based on the Controller Area Network (CAN).

The CAN-Transceiver has a factory-installed option available to provide up to four (4) independent opacity based automatic energy management systems.

The CAN-Transceiver contains a 4 line by 20 character liquid crystal display (LCD), and a sealed 16-key keypad. The drawing below shows the CAN-Transceiver with keypad assignment.





Chapter 2 Operation

The CAN-Transceiver continuously scans all of the controls to gather readings, set points and status information from each control. The data is kept in the CAN-Transceiver's memory so that a DCS system can read specific data. The DCS can also change data on the CAN-Transceiver at which point the CAN-Transceiver will send this change to the specific control affected. The following is a summary of the functions and data available to a distributed control system from a CAN-Transceiver.

RK2000 Status and Control

On/off command	On/off status
Remote/stand alone status	Manual status
Alarm reset command	Over current alarm
Under voltage status & trip alarm	External User alarms –1, 2, 3, 4
SCR Unbalance alarm	Contactor status
Continuous/IE operation status	IE enable/disable command
Communication alarms	

RK2000 Readings

Primary Voltage	Primary Current
Primary Power	Secondary Voltage KV1
Secondary Voltage KV2	Secondary Current
Sparks/minute	Arc/minute

RK2000 Set points

Primary Voltage limit	Primary Current limit
Secondary Voltage limit (KV average)	Secondary Current limit
Phase Back	Ramp
Pedestal Rate	Quench time
I.E. Charge half cycles	I.E. Discharge cycles
IE Background power	Under voltage level
Tumble hammer rapping	Power down rapping

MRC Status and Control

On/off command	On/off status
Stand Alone/remote status	Sequence all command
Rapper communication status	Alarm status

MRC Data

Open Alarmed rappers	Shorted Alarmed rappers
Rapper number being fired	Rapper Cycle Clock time
Rapper Wait Clock time	Rapper Intensity
Clock enable/disable command	

Chapter 3 Protocol

The protocol used for communication with the DCS is MODBUS. Only the binary form of the MODBUS protocol, remote terminal unit (RTU) framing is supported. The DCS must be configured as the MODBUS master. The CAN-Transceiver is configured as a MODBUS slave. The following MODBUS commands are supported by the CAN-Transceiver:

READ COIL STATUS (COMMAND BYTE = 01H)
READ INPUT STATUS (COMMAND BYTE = 02H)
READ HOLDING REGISTERS (COMMAND BYTE = 03H)
FORCE SINGLE COIL (COMMAND BYTE = 05H)
WRITE SINGLE REGISTER (COMMAND BYTE = 06H)
FORCE MULTIPLE COILS (COMMAND BYTE = 0FH)
WRITE MULTIPLE REGISTERS (COMMAND BYTE = 10H)

The electrical connection to the DCS is RS232/422/485 using 8 bits, even/odd parity and 1 stop bit. The data rate is selectable from 4800, 9600, and 19200 BPS. The slave address is the same as the value programmed as the CAN-Transceiver ID.

Energy Management System Addressing
The MODBUS protocol for the energy management system (EMS) is an integral part of the protocol used for obtaining information about the TR control(s). For MODBUS communications, the EMS acts as a separate controller from the basic CAN-Transceiver that supplies data for the TR control(s). The MODBUS slave address is the value programmed as the CAN-Transceiver ID plus 1. All other communication parameters are the same as that for the basic CAN-Transceiver.

Rapper System Addressing
The MODBUS protocol for the rapper control(s) is an integral part of the protocol used for obtaining information about the rapper control(s). For MODBUS communications, the rapper acts as a separate controller from the basic CAN-Transceiver that supplies data for the rapper control(s). The MODBUS slave address is the value programmed as the CAN-Transceiver ID plus 2. All other communication parameters are the same as that for the basic CAN-Transceiver.

NOTE: The DCS must not continuously transmit the write register commands (06H or 10H) to the CAN-Transceiver. A write command received by the CAN-Transceiver interrupts the communications to the local devices to prevent data update conflicts. Continuous write commands can result in a continuous interruption in local device communication.

Chapter 4 Keypad Description

The following is a description of the function of each key on the CAN-Transceiver's keypad.

Numerical keys - The numerical keys are used for entering numerical values for the programmable parameters.

Code key - To program any of the control parameters it is first necessary to enter a security code. This prevents unauthorized personnel from performing control adjustments. Programmable parameters can be viewed without entering a code.

UP key - Brings up the first programmable parameter into the Prompt screen. Pressing this key again will scroll up through the programmable parameters Prompt screens.

DWN key - Brings up the last programmable parameter into the Prompt screen. Pressing this key again will scroll down through the programmable parameters Prompt screens.

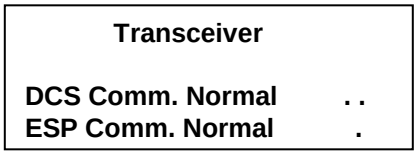
CLR key - Used when a numerical value programmed into the control is incorrect and the programmer wants to ignore the data entered, or when returning from a parameter Prompt screen to the Status screen.

MODE key – Used with the energy management system option. Pressing this key changes from the Status screen to the first Energy Management System (EMS) screen. Pressing this key again displays additional EMS screens, if available, and then back to the Status screen.

ENTER key - Used to accept numerical data that has been programmed into the keypad.

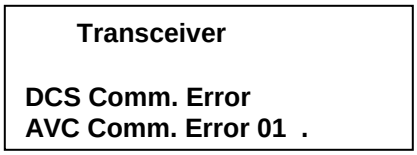
Chapter 5 Base Programming Instructions

When the control is initially turned on the Status screen is displayed as shown below.

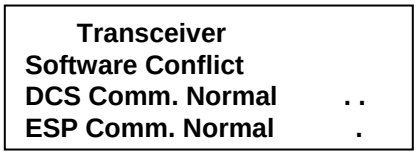


Under normal operating condition the CAN-Transceiver displays “Transceiver” on the top line of the screen and the second line is blank. The third line shows the DCS communications status. This will show “Normal” or “Error”. The error status indicates a valid MODBUS message has not been received within a preset time period. Two dots “**. .**” will flash at the end of this third line when a valid message is received and a response is transmitted. The fourth line shows the ESP communications status. This is the status of communications between the CAN-Transceiver and the TR controls (AVC) and the rapper controls (MRC). This will show “Normal” or “Error”. The ID of the TR control and/or rapper control not communicating with the CAN-Transceiver is displayed after the error status. If more than one AVC or MRC is not communicating, the ID of all devices not communicating will scroll sequentially. One dot “**.**” is displayed at the end of the fourth line indicating the CAN-Transceiver is attempting to communicate with the TR controls and the rapper controls.

The Status Screen below shows both DCS and TR control communication errors present. The AVC Comm. Error will alternate with the MRC Comm. Error if both are present at the same time,



The CAN-Transceiver has the ability to detect software version incompatibilities between it and the TR controls (AVC) and the rapper controls (MRC). This can occur when equipment is supplied at different times or if an error has been made in the base program of the AVC or MRC. An error message to indicate the problem is displayed on the second line

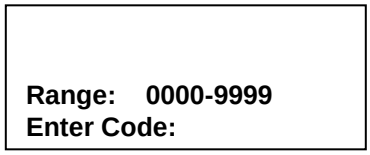


If this occurs the customer should contact their supplier to resolve the issue.

Security Code Entry

Although the setting of all the programmable parameters can be viewed at any time, changes to the settings cannot be made without first entering a security code.

Press the CODE key on the keypad and the following screen will be displayed:



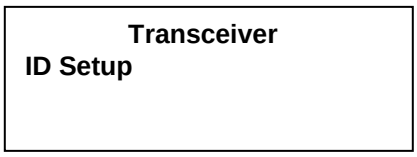
Press the numeric keypad keys that correspond to the appropriate access code. The numbers chosen will display as # as they are pressed. After the appropriate code is chosen press the ENTR key. If the code was an acceptable code, all parameters can now be programmed. If the code was not acceptable, or no code was entered, the icon of a padlock will appear on the bottom line of the various prompt screens indicating that changes cannot be made.

Parameters affecting the operation of the CAN-Transceiver can be programmed by pressing the DWN key to view the available Prompt Screens. The programmable parameters for CAN-Transceiver operation are listed below:

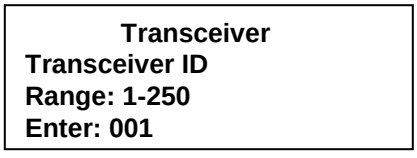
ID Setup
Loop Back Test
MODBUS Port Parity
MODBUS Baud Rate
Software Revision

ID Setup

From the Status Screen press the UP or DWN keys until the following ID Setup Prompt Screen appears:



Press the Enter key and the following screen will appear:



This and the following Prompt Screens are used to setup the CAN-Transceiver ID code, the CAN communication start ID, and the end ID. The CAN-Transceiver ID code must be unique if more than one CAN-Transceiver is connected to the same CAN communication network. This ID is also used for MODBUS serial communications to the DCS.

The ID code selected must take into consideration whether or not the CAN-Transceiver is equipped with an Energy Management System, and whether a rapper control is going to communicate with the CAN-Transceiver. If the CAN-Transceiver is equipped with an Energy Management System the ID code +1 must be reserved for the EMS. The ID code +2 must be reserved for the rapper control (regardless of the quantity of rapper controls).

Press the numeric keypad keys that correspond to the desired ID code. The numbers will appear opposite the word “Enter” as they are pressed. When the desired code is present press the ENTR key and the following screen will be displayed:

Transceiver
AVC Scan Start
Range: 0-99
Enter: 01

Each of the TR controls has a unique sequential ID number. It is necessary to tell this CAN-Transceiver which TR control (AVC) will be the first one it will communicate with. Press the numeric keypad keys that correspond to the desired value. The selected number will appear next to the word “Enter”. When the desired ID number is present press the ENTR key and the following screen will be displayed:

Transceiver
AVC Scan End
Range: 0-99
Enter: 01

It is necessary to tell this CAN-Transceiver which TR control (AVC) will be the last one it will communicate with. Press the numeric keypad keys that correspond to the desired value. The selected number will appear next to the word “Enter”. When the desired ID number is present press the ENTR key and the following screen will be displayed:

Transceiver
MRC Scan Start
Range: 0- 4
Enter: 1

Each of the rapper controls has a unique sequential ID number. It is necessary to tell this CAN-Transceiver which rapper control (MRC) will be the first one it will communicate with. Press the numeric keypad keys that correspond to the desired value. The selected number will appear next to the word “Enter”. When the desired ID number is present press the ENTR key and the following screen will be displayed (if the communication system does not include a rapper control use 0 as the ID number and the following screen will not appear):

```
        Transceiver
MRC Scan End
Range: 0- 4
Enter: 1
```

It is necessary to tell this CAN-Transceiver which rapper control (MRC) will be the last one it will communicate with. Press the numeric keypad keys that correspond to the desired value. The selected number will appear next to the word “Enter”. When the desired ID number is present press the ENTR key and the screen will return to the ID Setup Prompt Screen. Pressing the CLR key will bring up the Status Screen.

Loop Back Test

From the Status Screen press the UP or DWN keys until the following Loop Back Test Prompt Screen appears:

```
        Transceiver
Loop Back Test
```

This diagnostic function is used to test the serial communication port on the CAN-Transceiver to verify the port is working correctly. Before running this test the cable on connector P6 on the CAN-Transceiver must be removed. When the Transceiver is configured for RS-232 communications, pin 2 and pin 3 on connector P6 must be connected together. When configured for RS-422 communications pin 3 must be connected to pin 9 and pin 4 must be connected to pin 7 on connector P6.

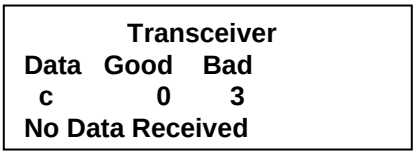
Press the ENTR key and the following screen appears:

```
        Transceiver
Loop Back Test
0=Disable, 1=Enable
Enter: 1
```

Press the numeric keypad key 1 or 0 to enable or disable this function, and press the ENTR key. If enable (1) was chosen the following display will appear:

```
        Transceiver
Data  Good   Bad
  a      1     0
```

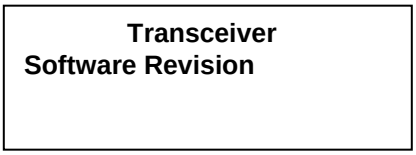
The Transceiver automatically transmits data out of the serial port and checks if the same data is received. If data is received correctly the “Good” counter is incremented. If the data received does not match, the “Bad counter is incremented. In addition, if no data is received the bottom line will display **No Data Received**.



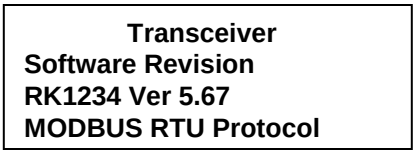
Press the CLR key to end the test. Connecting the cable going to the DCS and connecting the appropriate pins on the DCS end then running the loop back test can verify the cable wiring.

Software Revision

From the Status Screen press the UP or DWN keys until the following Software Revision Prompt Screen appears:



This prompt is used to determine the software number and revision. The manufacturer may need this information for troubleshooting purposes. Press the ENTR key and the following screen will appear:



Pressing the ENTR key returns you to the Software Version Prompt Screen. Press CLR and the Status Screen appears.

MODBUS Port Parity

From the Status Screen press the UP or DWN keys until the following MODBUS Port Parity Prompt Screen appears:

This prompt is used to select the parity of the serial communication between the DCS and the CAN-Transceiver. Power to the CAN-Transceiver should be cycled off and then on after changing the port parity.

Press the ENTR key and the following screen appears:

```
        Transceiver
MODBUS Port Parity
0=Even, 1=Odd
Enter: 0
```

Press the numeric keypad keys that correspond to the desired port parity. The selected number will appear next to the word “Enter”. When the desired port parity is present, press the ENTR key and the screen will return to the MODBUS Port Parity Prompt Screen. Pressing the CLR key will bring up the Status Screen.

MODBUS Baud Rate

From the Status Screen press the UP or DWN keys until the following MODBUS Baud Rate Prompt Screen appears:

```
        Transceiver
MODBUS Baud Rate
```

This prompt is used to select the serial communication rate between the DCS and the CAN-Transceiver. Power to the CAN-Transceiver should be cycled off and then on after changing the communication rate. Valid communication rates are 4800, 9600, and 19200 BPS.

Press the ENTR key and the following screen appears:

```
        Transceiver
MODBUS Baud Rate
4800, 9600, 19200
Enter: 09600
```

Press the numeric keypad keys that correspond to the desired baud rate. The selected number will appear next to the word “Enter”. When the desired baud rate is present, press the ENTR key and the screen will return to the MODBUS Baud Rate Prompt Screen. Pressing the CLR key will bring up the Status Screen.

Chapter 6 Energy Management System Programming

The energy management system function in the CAN-Transceiver provides automatic adjustments in TR power, as opacity changes, to provide the minimum TR power usage for a chosen opacity. The CAN-Transceiver supports up to four independent energy management systems (EMS) capable of controlling power to multiple TR controls grouped by field within a precipitator.

When the EMS option is not available for use with the CAN-Transceiver, the Energy Management Summary Screen and EMS Prompts will not be selectable from the main keypad.

When the optional EMS is available in the CAN-Transceiver, one EMS will be allowed for each configured precipitator, up to a maximum of four. Each EMS/precipitator will operate independently. The EMS will support up to six EMS fields. Each field will include one or more TR controls.

Energy Management System Prompts

Parameters affecting the operation of the energy managements system are as follows:

EMS Enable/ Disable
Power Mode
Parallel/Series Mode
Upper Opacity Limit *
Lower Opacity Limit *
Delay Time *
Rate of Change *
Minimum Power Level *
Minimum I.E. Level *

* The parameters associated with these prompts can only be changed at the CAN-Transceiver keypad.

EMS Summary Screen

From the CAN-Transceiver Status Screen press the MODE key. The EMS Summary Screen appears as shown below.

EMS1	**0% Failed**
100 Fld 1	**100 Fld 2**
100 Fld 3	**100 Fld 4**

The number of the EMS the data applies to is shown next to “EMS”. In this case it is EMS system 1. The 0% represents the present opacity, and in this case the word “Opacity” is replaced by the word “Failed” meaning that the opacity signal is out of range indicating a fault in the signal from the DCS. If the opacity is in the calibrate mode the characters “Cal.” are displayed in place of Opacity. The remaining lines show the power levels or IE charge/discharge values.

EMS Enable/Disable Prompt

Once in the EMS Summary Screen pressing the UP or DWN keys scrolls through the EMS Prompt Screens.

Press the UP key until the EMS Enable/Disable Prompt shown below appears.

```
EMS 1
EMS Enable/Disable
```

Press the ENTR key and the following screen appears.

```
EMS 1
EMS Enable/Disable
0=Disabled, 1=Enabled
Enter: 0
```

This prompt allows the operator to enable or disable the Energy Management System for the selected system. When disabled, all fields will be allowed to go to full power, or spark control, and changes in opacity will no longer have an effect on power. Enabling Energy Management restores the normal EMS operation and allows the power to automatically increase or decrease based on the Opacity level.

Press the numeric keypad key that corresponds to the desired setting. The chosen number will appear next to the word “Enter”. Press the ENTR key and the EMS Enable/Disable Prompt Screen reappears. Press the CLR key to return to the EMS Summary Screen (pressing the MODE key will return you to the CAN-Transceiver Status Screen).

Minimum I.E. Level Prompt

From the EMS Summary Screen press the UP or DWN key until the Minimum I.E. (Intermittent Energization) Level Prompt Screen appears as shown below.

```
EMS 1
Minimum I.E. Level
```

Intermittent Energization is a mode of operation where the number of charge (on) half cycles and the number of discharge (off) cycles can be chosen. Operating in the I.E. saves power without reducing the efficiency of the electrical field.

Press the ENTR key and the following screen appears:

```
EMS 1
Select Field Number
Range: 1-6
Enter: 1
```

This screen allows the user to specify the IE charge and discharge times corresponding to a minimum power level. An EMS field will not go below the IE times programmed for each field. Press the numeric keypad key corresponding to the desired EMS field to be programmed (your particular configuration may have less than six fields). Press ENTR and the following screen will appear:

```
EMS 1                Field 1
I.E. Charge 1/2 Cycl
Range: 2-32 Even
Enter: 02
```

This screen allows the programming of the charge (on) half cycles. This number must be an even number between 2 and 32. Press the numeric keypad key associated with the desired number and press ENTR. The following screen appears:

```
EMS 1                Field 1
I.E. Discharge Cycle
Range: 1-9 Cycle
Enter: 03
```

The value for the charge and discharge cycles programmed here is the lowest power level the TRs in the chosen EMS field will drop to while trying to conserve power in the IE mode of operation.
This screen allows the programming of the discharge (off) cycles. This number can be a number between 1 and 9. Press the numeric keypad key associated with the desired number and press ENTR.

The screen returns to the Minimum I.E. Level Prompt. Press the CLR key to return to the EMS Summary Screen (pressing the MODE key will return you to the CAN-Transceiver Status Screen).

Minimum Power Level Prompt

From the EMS Summary Screen press the UP or DWN key until the Minimum Power Level Prompt Screen appears as shown below.

EMS 1
Minimum Power Level

This prompt allows the programming of the minimum level based on full time power levels (SCR conduction angle) rather than I.E. power levels. Press the ENTR key and the following screen appears:

EMS 1
Select Field Number
Range: 1- 6
Enter: 1

An EMS field will not go below the Minimum Power Level programmed for each field. Press the numeric keypad key corresponding to the desired EMS field (your particular configuration may have less than six fields). Press ENTR and the following screen will appear:

EMS 1
Minimum Power Level
Range: 1 – 100 %
Enter: 050

The value for the Minimum Power Level programmed here is the lowest power level the TRs in the chosen EMS field will drop to while trying to conserve power in the Reduced Power mode of operation.

Press the numeric keypad keys corresponding to the desired power level and press the ENTR key. The screen returns to the Minimum Power Level Prompt. Press the CLR key to return to the EMS Summary Screen (pressing the MODE key will return you to the CAN-Transceiver Status Screen).

Rate of Change Prompt

From the EMS Summary Screen press the UP or DWN key until the Rate of Change Prompt Screen appears as shown below.

```
EMS 1
Rate of Change
```

This screen allows the programming of a scaling factor for changes in power levels. Small values of this parameter result in smaller changes in power levels when the EMS requires a power reduction; large values result in larger changes in power levels when the EMS requires a power increase. This parameter is used only in the Reduced Power operating mode.

Press the ENTR key and the following screen appears:

```
EMS 1
Rate of Change
Range: 1- 9
Enter: 2
```

Press the numeric keypad keys corresponding to the desired power level and press the ENTR key. The screen returns to the Rate of Change Prompt. Press the CLR key to return to the EMS Summary Screen (pressing the MODE key will return you to the CAN-Transceiver Status Screen).

Delay Time Prompt

From the EMS Summary Screen press the UP or DWN key until the Delay Time Prompt Screen appears as shown below.

```
EMS 1
Delay Time
```

This prompt allows the operator to specify the time between power adjustments. It specifies the time, in seconds, which the EMS waits between checking the opacity level and making power adjustments to the EMS fields. This value should be slightly greater than the time required for gas to flow from the inlet of the precipitator to the opacity meter.

Press the ENTR key and the following screen appears:

```
EMS 1
Delay Time
Range: 1-999 seconds
Enter: 060
```

Press the numeric keypad keys that correspond to the desired delay time, and then press the ENTR key. The screen returns to the Delay Time Prompt. Press the CLR key to return to the EMS Summary Screen (pressing the MODE key will return you to the CAN-Transceiver Status Screen).

Lower Opacity Limit Prompt

From the EMS Summary Screen press the UP or DWN key until the Lower Opacity Limit Prompt Screen appears as shown below.

```
EMS 1
Lower Opacity Limit
```

This field allows the programming of the lower opacity limit (in percent). Opacity readings below this limit automatically result in a power decrease to one or more EMS fields.
Press the ENTR key and the following screen appears:

```
EMS 1
Lower Opacity Limit
Range: 1-15 %
Enter: 010
```

The highest number of the range is dependent on the setting of Upper Opacity Limit (see below). It is set by the upper opacity limit so the lower limit can never be set above the upper limit. Press the numeric keypad keys that correspond to the desired lower limit, and then press the ENTR key. The screen returns to the Lower Opacity Limit Prompt. Press the CLR key to return to the EMS Summary Screen (pressing the MODE key will return you to the CAN-Transceiver Status Screen).

Upper Opacity Limit Prompt

From the EMS Summary Screen press the UP or DWN key until the Lower Opacity Limit Prompt Screen appears as shown below.

```
EMS 1
Upper Opacity Limit
```

This field allows the programming of the upper opacity limit (in percent). Opacity readings above this limit automatically result in a power increase to one or more EMS fields. Press the ENTR key and the following screen appears:

```
EMS 1
Upper Opacity Limit
Range: 10-100
Enter: 020
```

The lowest number of the range is dependent on the setting of Lower Opacity Limit (see above). It is set by the lower opacity limit so the upper limit can never be set below the lower limit. Press the numeric keypad keys that correspond to the desired upper limit, and then press the ENTR key. The screen returns to the Upper Opacity Limit Prompt. Press the CLR key to return to the EMS Summary Screen (pressing the MODE key will return you to the CAN-Transceiver Status Screen).

Parallel/Series Prompt

From the EMS Summary Screen press the UP or DWN key until the Lower Opacity Limit Prompt Screen appears as shown below.

```
EMS 1
Parallel/Series Mode
```

This prompt allows the programming of which mode the EMS will adjust power to the EMS fields. The parameter can be set to either the Series or Parallel mode of operation. In the Parallel mode, the power to all TRs (EMS fields) is increased or decreased, as needed, at the same time. In the Series mode, the power to the TRs is increased or decreased, as needed, one field at a time. The TRs designated as EMS field one will be the first field to reduce power. The power level will be reduced, if required, down to the Minimum Power Level (previously discussed) before the power to the second EMS field is reduced. The same process occurs until the last EMS field is at its Minimum Power Level. The last EMS field to decrease power will be the first EMS field to increase power as more power is required by the EMS. Which TRs are assigned to which EMS fields is a parameter programmed into the TR controls. Refer to your TR control operating manual.

Press the ENTR key and the following screen will appear:

```
EMS 1
Parallel/Series Mode
0=Parallel, 1=Series
Enter: 1
```

Press the numeric keypad keys corresponding to parallel or series mode of operation, and then press the ENTR key. The screen returns to the Series/Parallel Mode Prompt. Press the CLR key to return to the EMS Summary Screen (pressing the MODE key will return you to the CAN-Transceiver Status Screen).

Power Mode Prompt

From the EMS Summary Screen press the UP or DWN key until the Power Mode Prompt Screen appears as shown below.

```
EMS 1
Power Mode
```

This prompt allows the operator to select how the Energy Management System controls power to the T/R sets. The choice is either by adjusting the maximum conduction angle (% power) or by adjusting the Intermittent Energization charge and discharge cycles.

Press the ENTR key and the following screen appears.

```
EMS 1
Power Mode
0=I.E., 1=% Power
Enter: 1
```

Press the numeric keypad keys that correspond to the desired operating mode, and press the ENTR key. The screen returns to the Power Mode Prompt. Press the CLR key to return to the EMS Summary Screen (pressing the MODE key will return you to the CAN-Transceiver Status Screen).

Opacity Input Calibration

If a 4ma to 20ma signal, representing the opacity level, is being brought directly into the Isolation/Converter module associated with the CAN-Transceiver (as apposed to having the opacity level sent over the communications loop) it must be calibrated.

If an Isolation/Converter is being used, it has been factory calibrated and the measured signal values needed to re-calibrate the system are recorded on the CAN-Transceiver back cover.

The following procedure should be followed if either the Isolation/Converter or the CAN-Transceiver is replaced with another unit.

Make sure the CAN-Transceiver and the Isolation/Converter have been energized for at least 15 minutes.

From the EMS Summary Screen press the UP or DWN key until the Analog Input Setup Prompt Screen appears as shown below.

Analog Input Setup

Press Enter and the first calibration screen will appear.

Set analog input to 4.00 mA. Press [ENTR]

Apply a stable 4mA signal to the input (TB1 terminals 3 and 4) of the Isolation/Converter. While this signal is applied press the ENTR key. The following screen will appear.

Ain Zero Calibrate Getting data. Please wait……

A period (.) will appear after the word wait every six (6) seconds. At the end of approximately 56 seconds the display will show the following.

Ain Zero Calibrate Range: 100-300 Enter: xxx (yyy)

xxx represents the present value of the programmed parameter and yyy is the control's measured value of the signal. Press the numeric keys that correspond to the yyy value. The xxx numbers will be replaced with the yyy numbers. Press the ENTR key. The 4.0ma level has now been calibrated. The following screen now appears.

Set analog input to 20.0 mA. Press [ENTR}

Apply a stable 20.0mA signal to the input (TB1 terminals 3 and 4) of the Isolation/Converter. While this signal is applied press the ENTR key. The following screen will appear.

Ain Max Calibrate **Getting data. Please wait……**

A period (.) will appear after the word wait every six (6) seconds. At the end of approximately 56 seconds the display will show the following.

Ain Max Calibrate **Range: 900-1023** **Enter: xxxx (yyyy)**

xxxx represents the present value of the programmed parameter and yyyy is the control's measured value of the signal. Press the numeric keys that correspond to the yyyy value. The xxxx numbers will be replaced with the yyyy numbers. Press the ENTR key. The 20.0ma level has now been calibrated.

Note: If both the Can-Transceiver and the Isolation/Converter have never been replaced, the values for the 4ma and 20ma ranges that are recorded on the back of CAN-Transceiver can be entered without having to provide a signal to the Isolation/Converter input. Simply follow the above procedure and enter the appropriate value in the appropriate screen.

If you have a second energy management system (EMS), go to the EMS 2 set up screen and repeat the above calibration using TB1 terminals 5 and 6 for the 4mA and 20Ma input.

Register Display Mode

A special display mode is available in the CAN-Transceiver to show the registers associated with the TR control register map. This provides the system integrator with a diagnostic aid in troubleshooting the connection to a DCS.

The register display mode is accesses by entering a special security code. This code is 8401. Press the CODE key, enter code 8401, and press ENTR. The following screen will appear:

```
Register Display
0=Disable, 1=Enable
Enter: 0
```

Press the numeric keypad key 1 or 0 to enable or disable this function, and press the ENTR key. If enable (1) was chosen the following display will appear:

```
Register Display
0=AVC, 1=EMS, 2=MRC
Enter: 0
```

Press 0 to select AVC registers for display and 1 to select EMS, or 2 to select MRC registers and then press ENTR. The following display will appear:

```
Register Display
Starting Register
Enter: 0001
```

The address and value of eight registers starting with the chosen register number is then displayed and updated once per second. The register addresses are displayed in decimal form followed by a colon. The register value follows the colon and is displayed in hexadecimal form.

Press the numeric keypad keys corresponding to the starting register number. The numbers chosen will display next to the word “Enter”. Press the ENTR key and the following screen will appear:

```
0001:0000  0005:0000
0002:0000  0006:02B6
0003:0000  0007:0000
0004:0000  0008:0000
```

This screen shows eight registers and their values, starting with the chosen register. To chose new registers press CODE, 8401, ENTR, 1, ENTR, the new start register number, and ENTR. To return to the CAN-Transceiver Status Screen from the register screen press CODE, 8401, ENTR, 0, ENTR.

Can-Transceiver Communication Configurations For Board Number RK2055

Note: RK2055 Rev 1 ONLY
The silk screened text on the actual board that references J14 is incorrect. Please disregard the screened text description and use the settings described below.

RS-232-------
(Default)

J4---Out
J9---Jump pins 2 & 3
J10---Jump pins 2 & 3
J11---Out
J12---Out
J13---Out
J14---Jump pins 1 & 2
J15---Jump pins 2 & 3
J16---Jump pins 2 & 3
J17---Always Out
J18---Always Out

Communication Pin Configuration	
2	Tx
3	Rx
5	Signal Ground

RS-422-------
(4 Wire system)

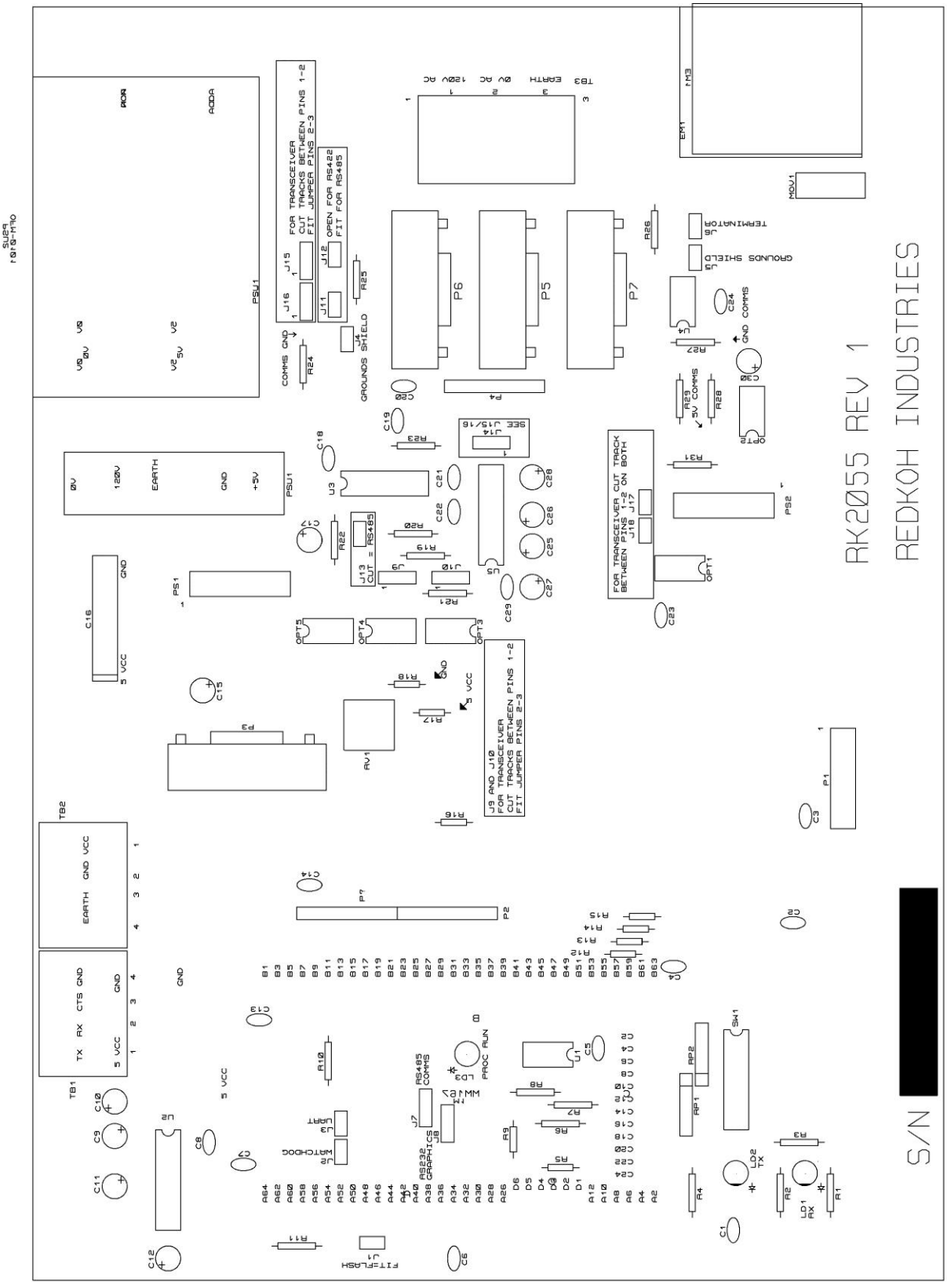
J4---In
J9---Jump pins 1 & 2
J10---Jump pins 1 & 2
J11---Out
J12---Out
J13---In
J14---Jump pins 2 & 3
J15---Jump pins 1 & 2
J16---Jump pins 1 & 2
J17---Always Out
J18---Always Out

Communication Pin Configuration	
7	Rx (-)
3	Rx (+)
4	Tx (-)
9	Tx (+)

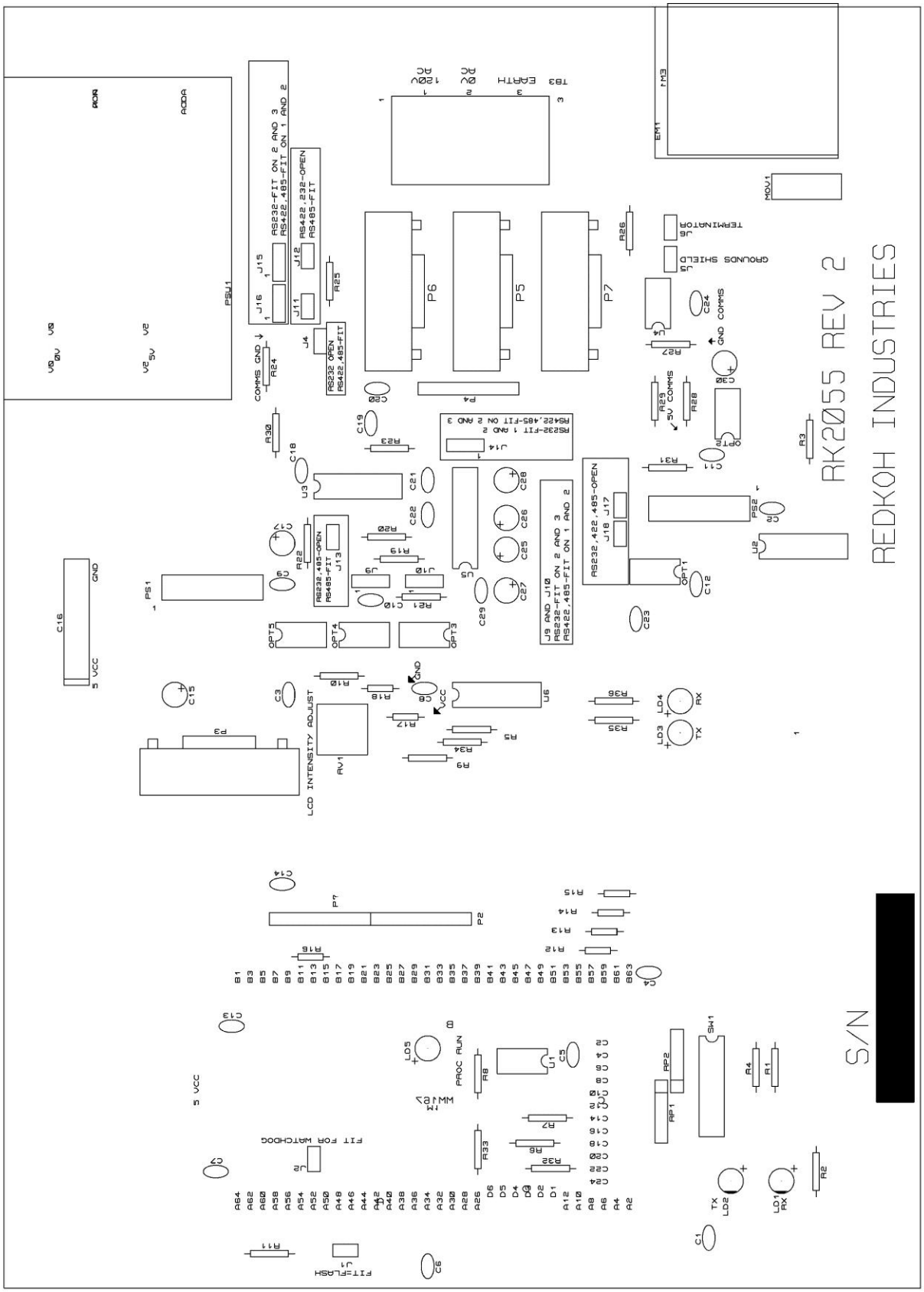
RS-485-------
(2 Wire system)

J4---In
J9---Jump pins 1 & 2
J10---Jump pins 1 & 2
J11---In
J12---In
J13---Out
J14---Jump pins 2 & 3
J15---Jump pins 1 & 2
J16---Jump pins 1 & 2
J17---Always Out
J18---Always Out

Communication Pin Configuration	
4, 7	Rx/Tx (-)
3, 9	Rx/Tx (+)



RK 2055 REV. 1 Transceiver Printed Circuit Board Layout



RK 2055 REV. 2 Transceiver Printed Circuit Board Layout

Can-Transceiver Communication Configurations For Board Number RK2712

RS-232-------
(Default)

J4---Out
J9---Jump pins 2 & 3
J10---Jump pins 2 & 3
J11---Out
J12---Out
J13---In
J14---Jump pins 2 & 3
J15---Jump pins 2 & 3
J16---Jump pins 2 & 3
J17---Always Out
J18---Always Out

Communication
Pin Configuration
2 Tx
3 Rx
5 Signal Ground

RS-422-------
(4 Wire system)

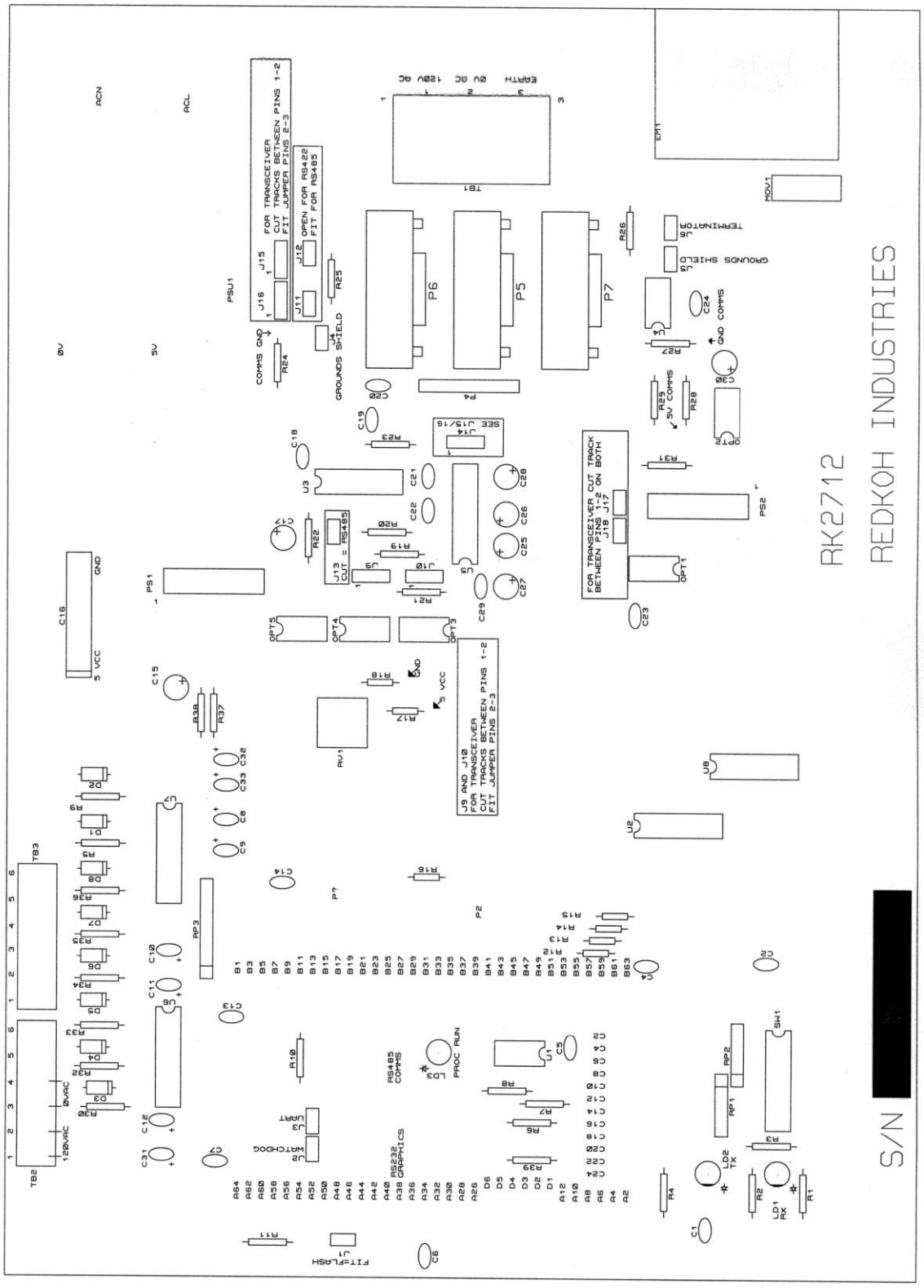
J4---In
J9---Jump pins 1 & 2
J10---Jump pins 1 & 2
J11---Out
J12---Out
J13---In
J14---Jump pins 1 & 2
J15---Jump pins 1 & 2
J16---Jump pins 1 & 2
J17---Always Out
J18---Always Out

Communication
Pin Configuration
7 Rx (-)
3 Rx (+)
4 Tx (-)
9 Tx (+)

RS-485-------
(2 Wire system)

J4---In
J9---Jump pins 1 & 2
J10---Jump pins 1 & 2
J11---In
J12---In
J13---Out
J14---Jump pins 1 & 2
J15---Jump pins 1 & 2
J16---Jump pins 1 & 2
J17---Always Out
J18---Always Out

Communication
Pin Configuration
4, 7 Rx/Tx (-)
3, 9 Rx/Tx (+)



RK 2712 Transceiver Printed Circuit Board Layout