

NATIONAL RADIO ASTRONOMY OBSERVATORY
GREEN BANK, WEST VIRGINIA

ELECTRONICS DIVISION TECHNICAL NOTE NO. 160

Title: WEATHER MONITOR SYSTEM

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WEATHER MONITOR SYSTEM

Dwayne R. Schiebel

Introduction

This note describes a WEATHER MONITOR SYSTEM that was built to enable a PC to input weather information through its serial port. This system was built around the VLBA MONITOR & CONTROL CARD. In addition to weather information, 16 bits of digital input and output were provided. In order to provide isolation between the weather monitor chassis and the PC the data link is over fiber-optic cable. This fiber-optic cable is connected to a multiplexer built by R. Weimer.

Programming

The selected ID for VLBA M & C card is 8. All addresses are base address plus indicated address.

ADDRESS

- 0 Dew Point
- 1 Temperature
- 2 Barometric Pressure
- 3 Wind Speed
- 4 Spare Analog Ch 4
- 5 Spare Analog Ch 5
- 6 Spare Analog Ch 6
- 7 Spare Analog Ch 7

- 64 Digital Output, 16 Bits
 - D0 Alarm, output a 1 to close a contact
 - D1-D3 Spare output contact closures
 - D4-D7 Complemented TTL output bits
 - D8-D15 True TTL output bits
- 68 Digital Input, 16 Bits
 - D0-D3 Optical isolated input bits
 - D4-D15 TTL true input bits

Electronics Descriptions

M & C Card Interface

The VLBA MONITOR & CONTROL CARD and its associated interface logic is contained in one chassis; the block diagram (B17215K001) for this system can be found at the end of this note. It contains three modules: An RS422 to Fiber-Optic Converter, Interface for VLBA M & C card and the VLBA M & C card.

The RS422 to Fiber Converter can be found on drawing B17215S002. This circuit was a copy of R. Weimer's circuit used in the Receiver Monitor Control system. This converter circuit card can be removed through the back panel of the Weather Monitor Chassis. For test purposes a card has been designed to

allow the connection of the Weather Monitor directly to the PC without going through fiber cable, reference drawing B17215S006.

Logic to interface the outside world to the VLBA M & C card can be found on logic drawings B17215L001. Page 1 of the drawings contain the logic to generate the necessary VLBA M & C handshake signals. The digital output logic is on page 2 and digital input logic is on page 3. Take note of the optical isolated inputs D0-D3; the maximum input current is 50 mA.

A complete wiring diagram of the weather monitor chassis can be found on drawing number B17215S003.

Analog Buffer Cards

Two analog buffer cards were built to condition the weather information before it is supplied to the weather monitor chassis.

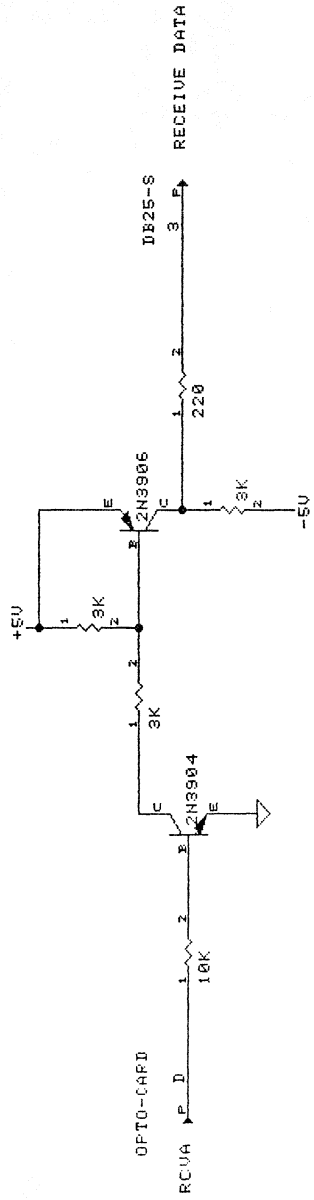
The first card, drawing B17215S004, was an addition to an existing buffer card. This card was used to buffer dew point, temperature and barometric pressure before it was sent to the 140-ft telescope. This card was modified by duplicating the three buffers and providing this weather information to the weather monitor chassis.

The second buffer card is used for wind speed. It plugs into the wind speed chassis and provides gain and filtering for the weather monitor.

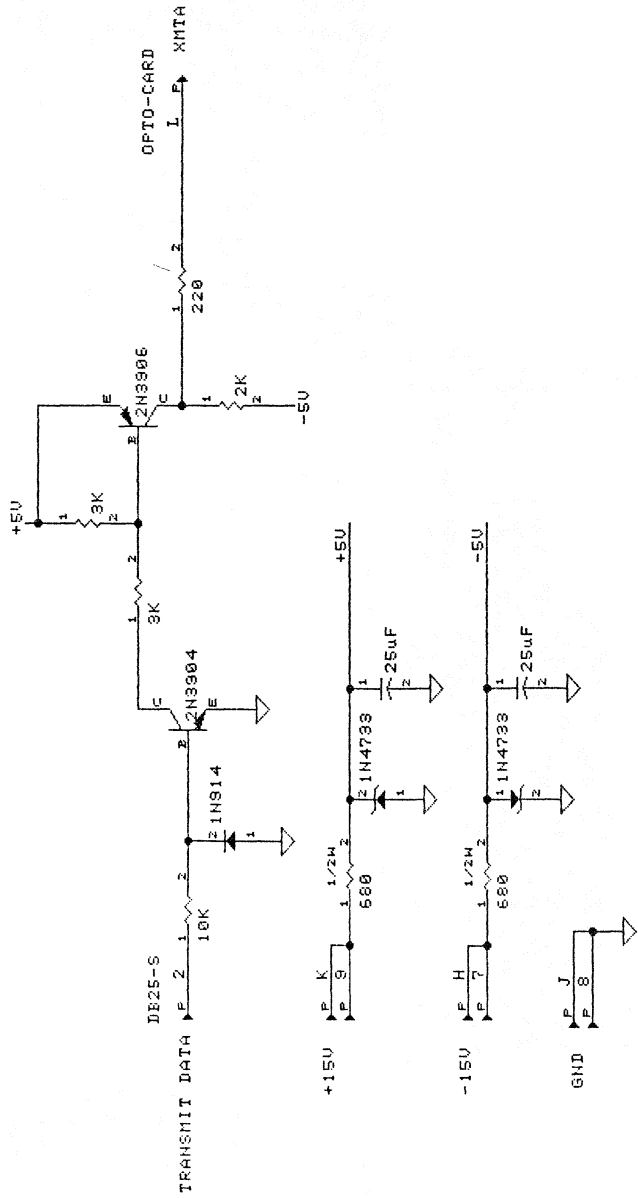
Credits

Credit should be given to R. Weimer for the fiber-optic circuit, to J. Turner for constructing the necessary equipment for the weather monitor, the Green Bank Shop for constructing the chassis, and to the designers of the VLBA M & C card.

RECEIVE DATA, SHALLOWAY CARD TO SERIAL PORT



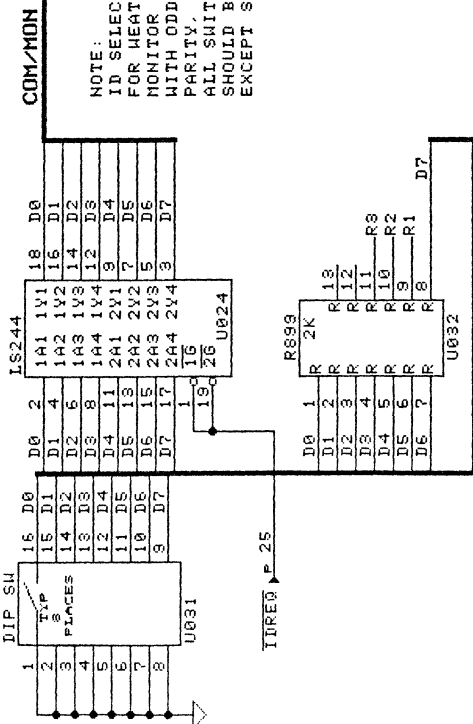
TRANSMIT DATA, SERIAL PORT TO SHALLOWAY CARD



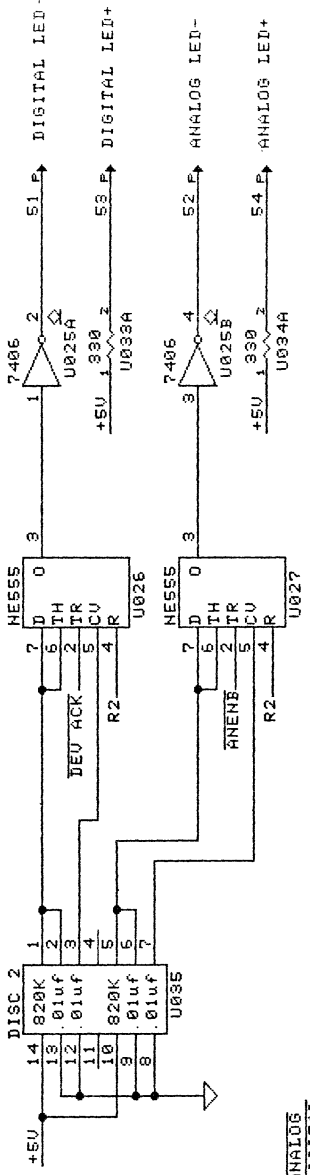
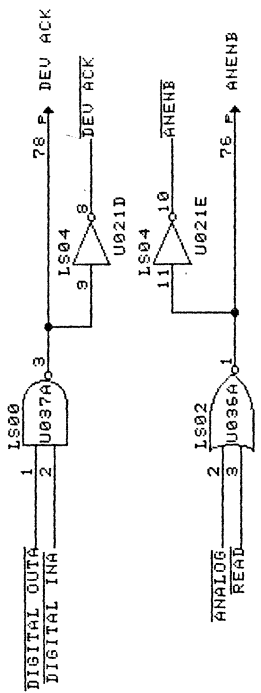
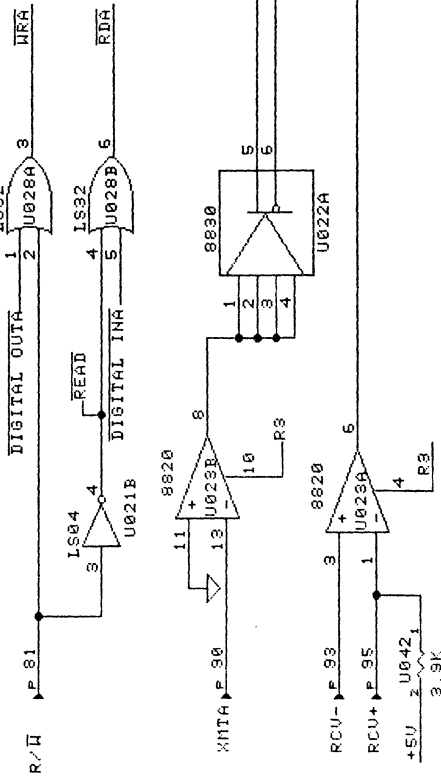
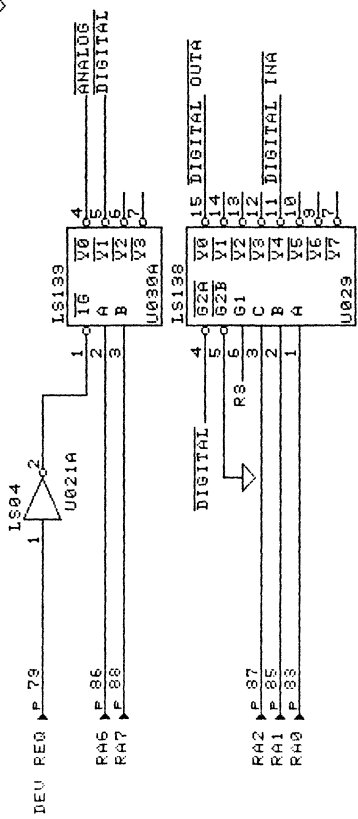
TEST BOARD TO REPLACE OPTO-CARD
AND GO DIRECTLY TO SERIAL PORT

NRAO GREEN BANK		
TITLE WEATHER MONITOR FOR INTER. 85-3 COMP		
SIZE B	NUMBER B17215S006	REV A
DATE AUG 11, 1989		SHEET 1 OF 1

ID SELECT



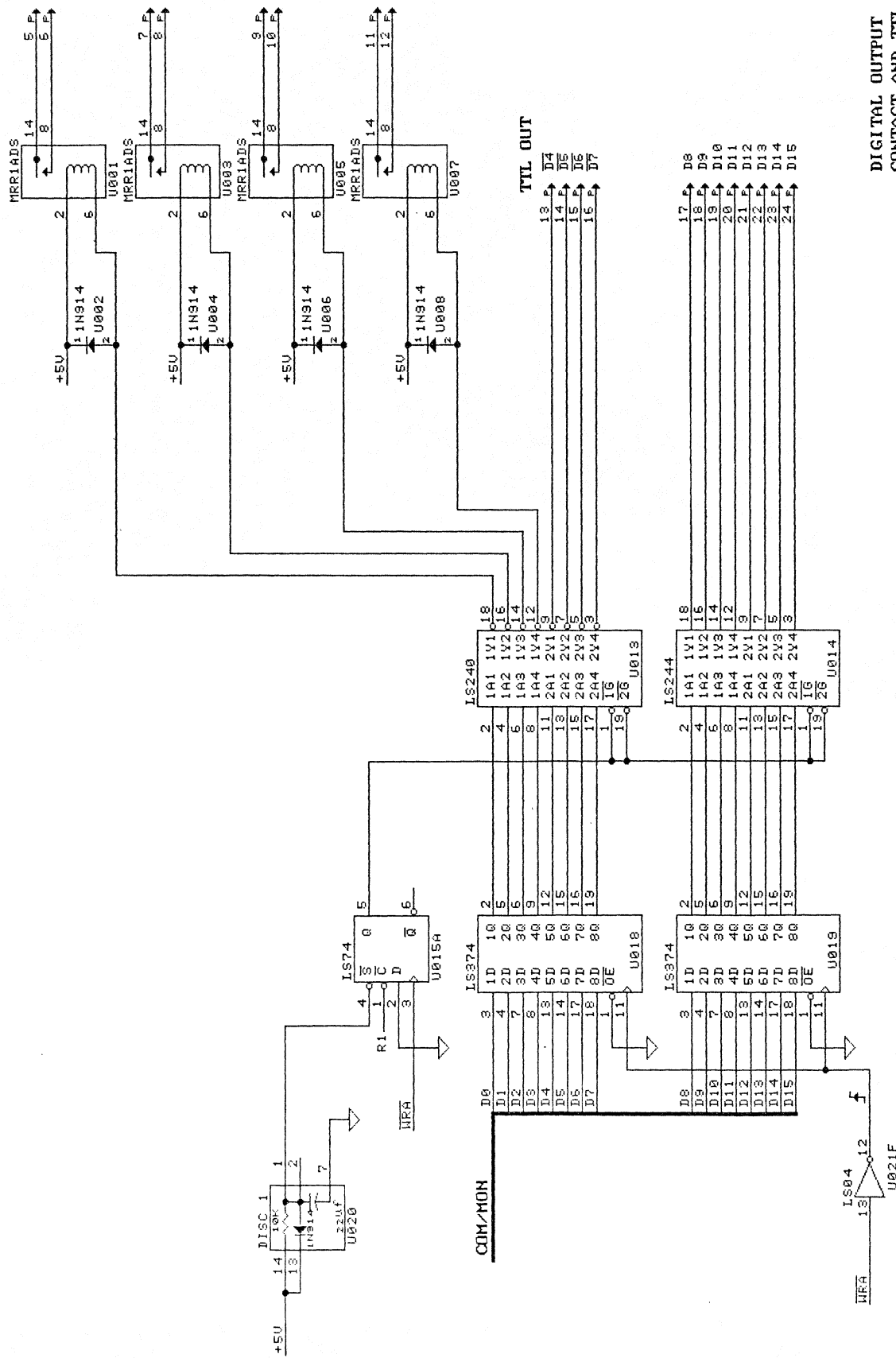
NOTE:
 ID SELECTED FOR WEATHER MONITOR IS 8 WITH ODD PARITY. SO ALL SWITCHES SHOULD BE CLOSED EXCEPT SW 4



92 P HI/LO SEL
 NOTE: HI/LO SEL CAN BE USED TO MULTIPLEX ANALOG INPUT

ID REQUEST
 DEV REQ ANENB
 ADDRESS DECODE
 READ & WRITE ENABLES

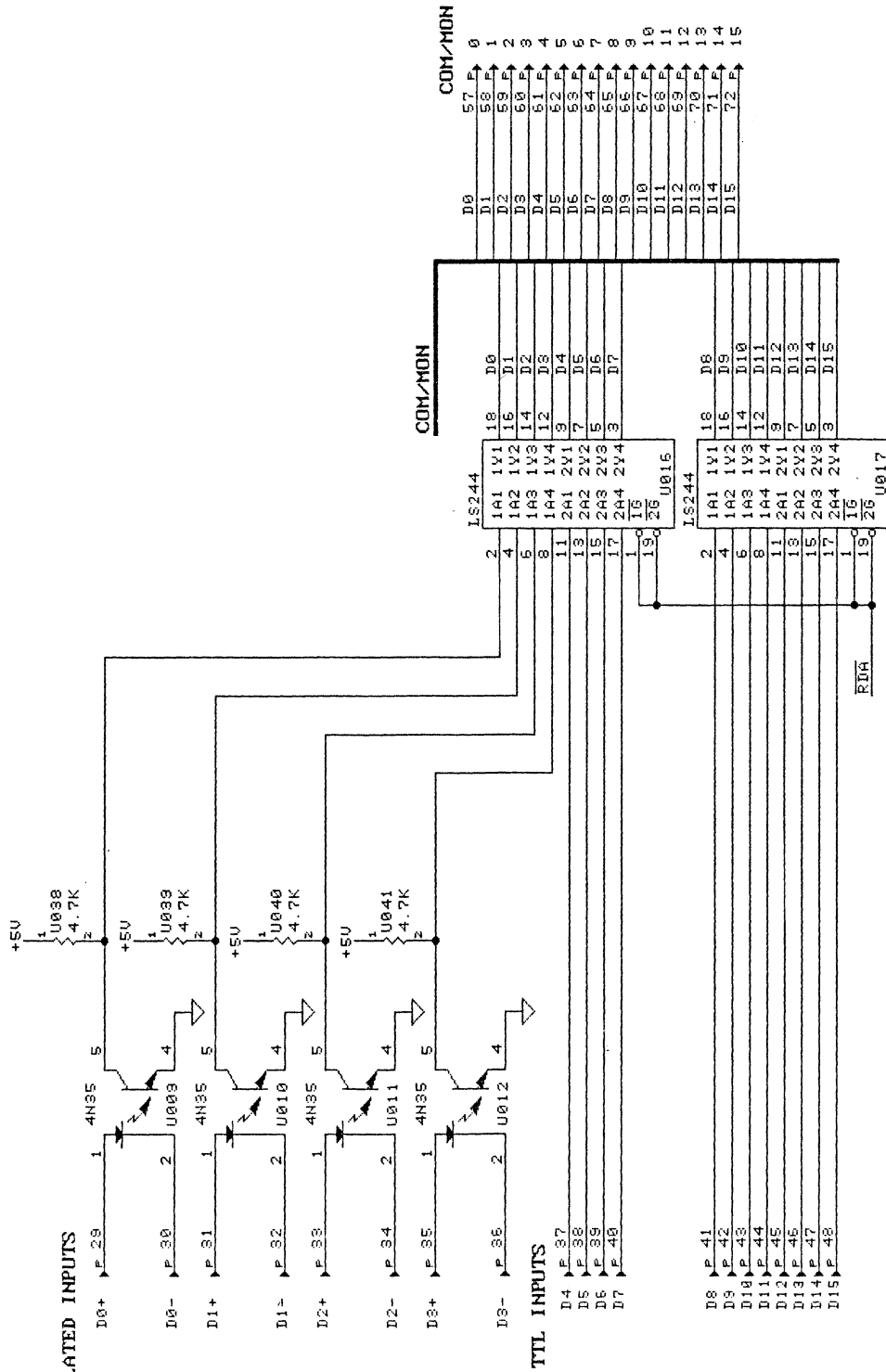
NRAD GREEN BANK	
TITLE WEATHER MONITOR FOR INTER. 85-3 COMP	
SIZE B	NUMBER B172151001
REV B	DATE AUG 14, 1988
SHEET 1 OF 5	



DIGITAL OUTPUT
CONTACT AND TTL

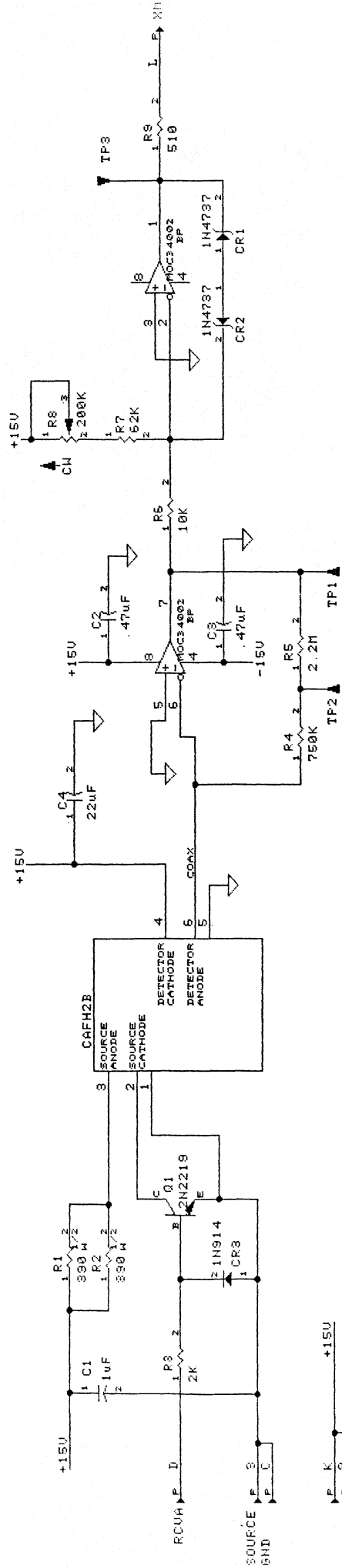
NR40 GREEN BANK	
TITLE WEATHER MONITOR FOR INTER. 85-3 COMP	
SIZE B	NUMBER B172151001
DATE AUG 14 1989	SHEET 2 OF 3

ISOLATED INPUTS



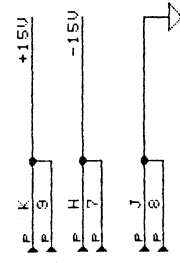
**ISOLATED INPUT AND
TTL INPUTS**

NRAO GREEN BANK		
TITLE WEATHER MONITOR FOR INTER. 85-3 COMP		
SIZE B	NUMBER B17215L001	FEED A
DATE AUG 14, 1989		SHEET 3 OF 3



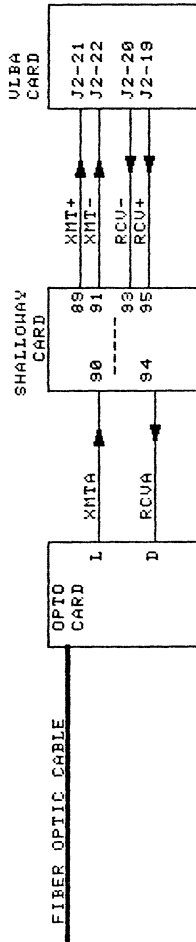
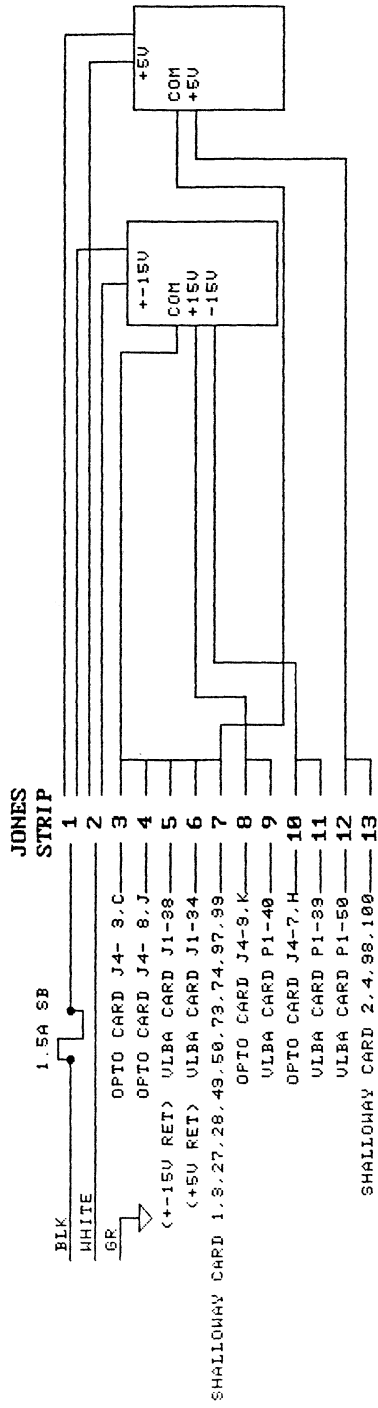
NOTE:
 When in operation look at P-P level at TP1, it should be 1 to 4U P-P. For short runs it may be > 4U. Short TP1 to cut gain of first stage. Adjust pot for good crossover points after gain of first stage is adjusted. Turn pot clockwise for low input and counter clockwise for high input.

UNLESS OTHERWISE NOTED ALL RESISTORS ARE 1/4 W



OPTICAL COUPLER CARD

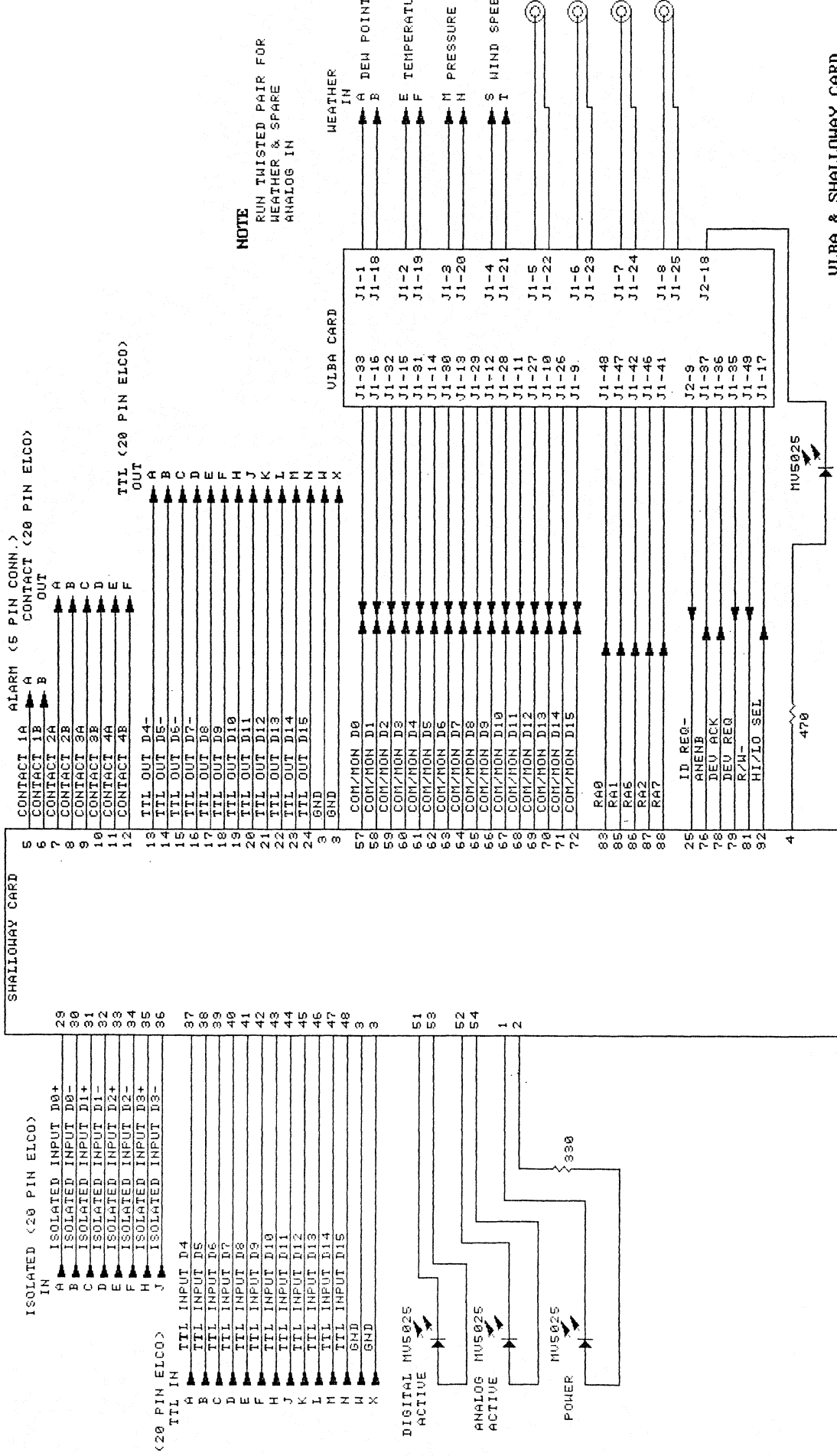
NRAD GREEN BANK	
TITLE WEATHER MONITOR FOR INTER. 85-3 COMP	
SIZE B	NUMBER B17215S002
DATE AUG 21 1989	SHEET 1 OF 1



WEATHER MONITOR CHASSIS
POWER WIRING
XMIT/REC TO ULBA CARD

NRAO GREEN BANK
TITLE WEATHER MONITOR FOR
INTER. 85-3 COMP

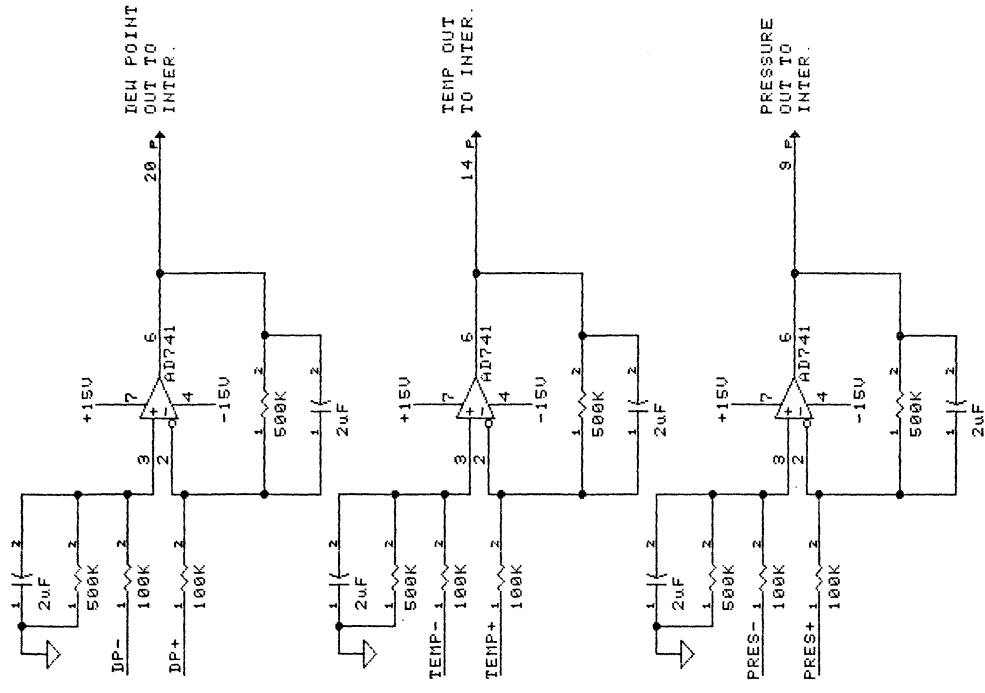
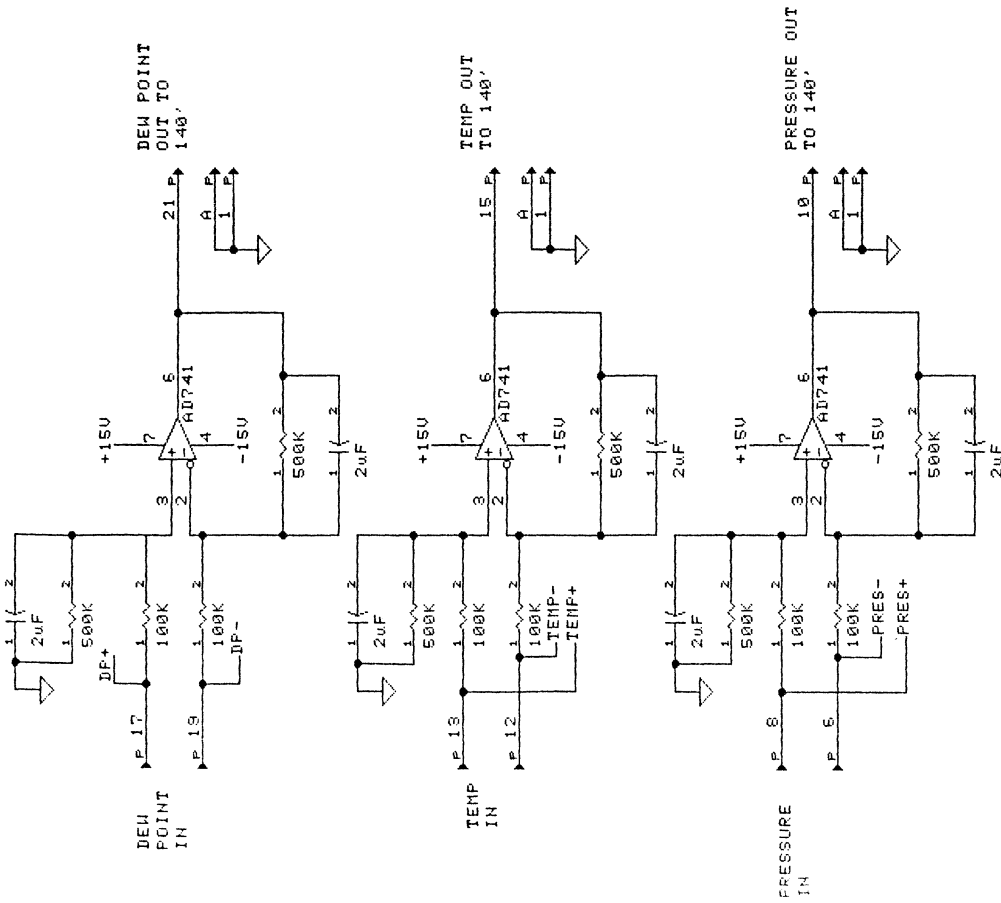
SIZE B	NUMBER B17215S003	REV. A
DATE SEPT 28, 1989		SHEET 1 OF 2



NOTE
 RUN TWISTED PAIR FOR
 WEATHER & SPARE
 ANALOG IN

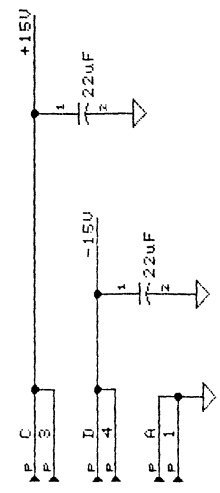
**ULBA & SHALLOWAY CARD
 WIRING**

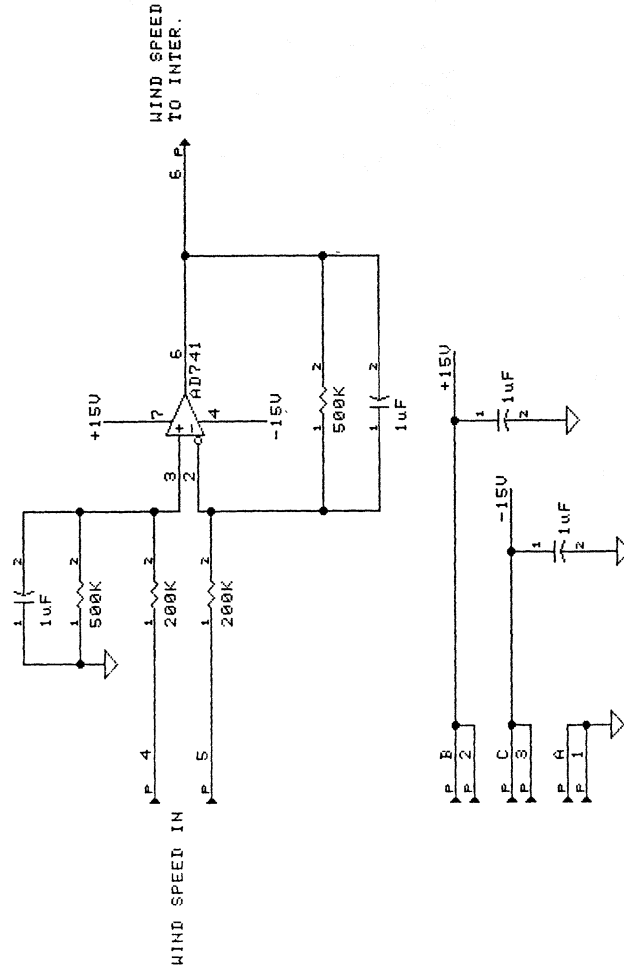
NRAD GREEN BANK	
TITLE WEATHER MONITOR FOR INTER. 85-3 COMP	
SIZE B	REVISION B
DATE SEPT 29, 1989	SHEET 2 OF 2



TEMPERATURE, PRESSURE & DEM POINT BUFFERS FOR 140' AND INTERFEROMETER

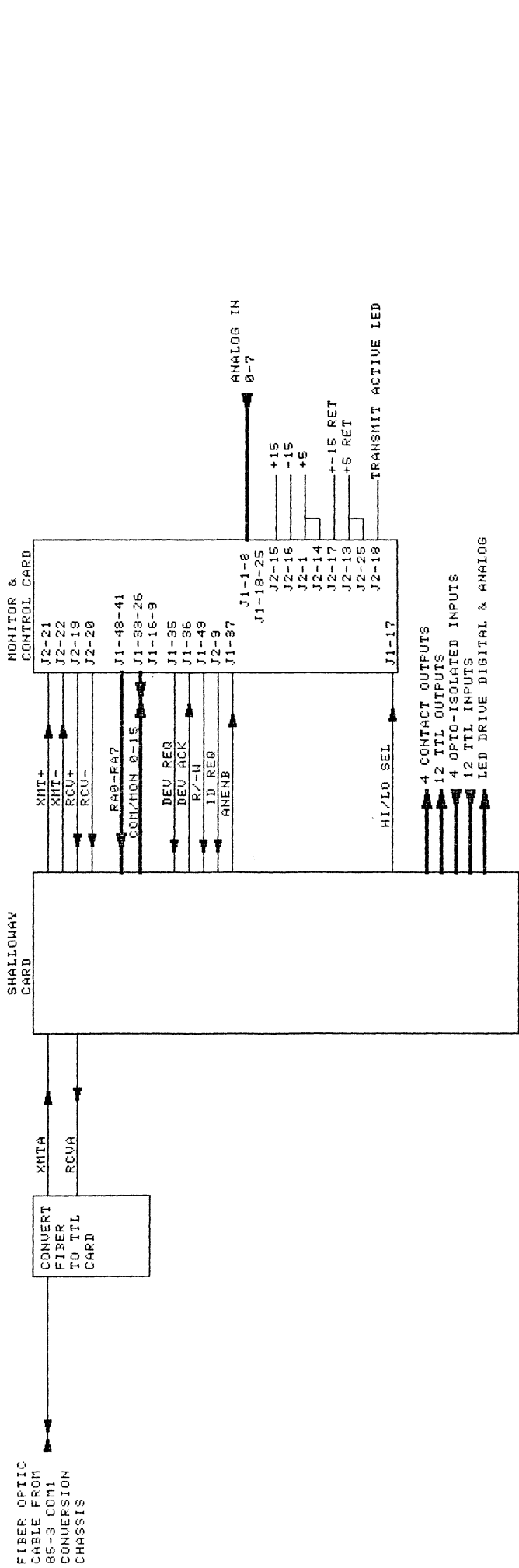
NR40 GREEN BANK	
TITLE WEATHER MONITOR FOR INTER. 85-3 COMP	
SIZE B	NUMBER B17215S004
DATE AUG 22, 1989	SHEET 1 OF 1





WINDSPEED BUFFER

NRAD GREEN BANK	
TITLE WEATHER MONITOR FOR INTER. 85-3 COMP	
SIZE B	NUMBER B17215S005
DATE AUG 22, 1989	
SHEET 1 OF 1	



BLOCK DIAGRAM FOR WEATHER MONITOR SYSTEM

NRAD GREEN BANK	
TITLE WEATHER MONITOR FOR INTER. 85-3 COMP	
SIZE B	NUMBER B17215K001
DATE AUG 11, 1989	SHEET 1 OF 1