TDRSS User RF Test Set (TURFTS)

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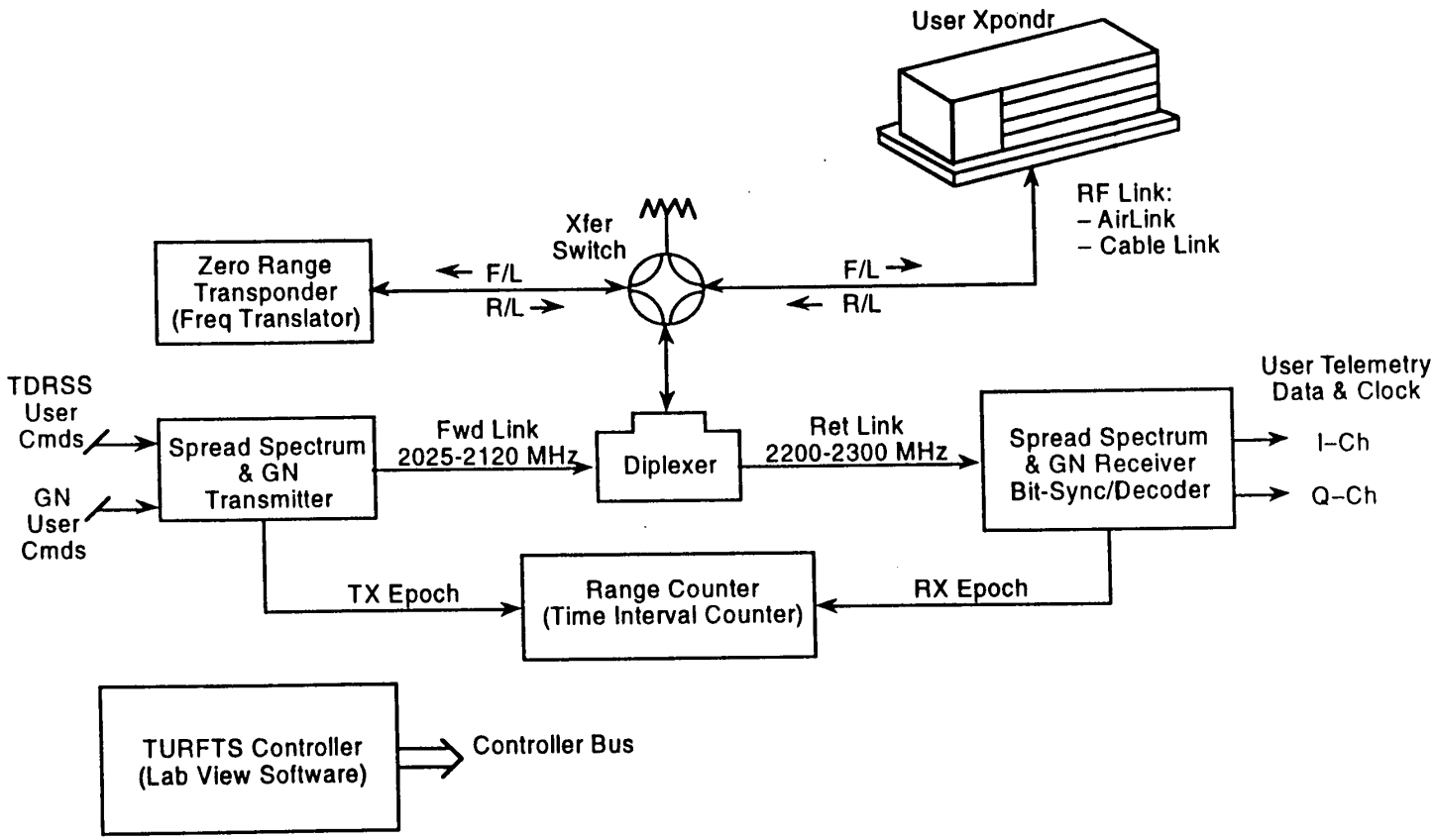
- In the early '90's, code 531.2/RF Systems Section began in-house development of a modern, low-cost transponder test set (TURFTS)
- The initial requirement was to develop a transportable test set for integration and pre-flight TDRSS transponder testing for the Wallops Long Duration Balloon Program (LDBP)

TURFTS Characteristics

- TURFTS was recently upgraded to provide both TDRSS and Ground Network modes of operation
- TURFTS emulates forward link signals and receivers and demodulates return link signals from the vehicle under test
- TURFTS includes COTS test equipment and a PC-based system controller which executes a custom lab view GUI application
- The TURFTS receiver is a modern DSP design containing a bit synch, de-interleaver and viterbi decoder
- The frequency generation subsystems are based on direct digital synthesis NCO technology
- TURFTS can be remote controlled from a central computer or via the internet from anywhere in the world

TDRSS User RF Test Set (TURFTS)



TDRSS

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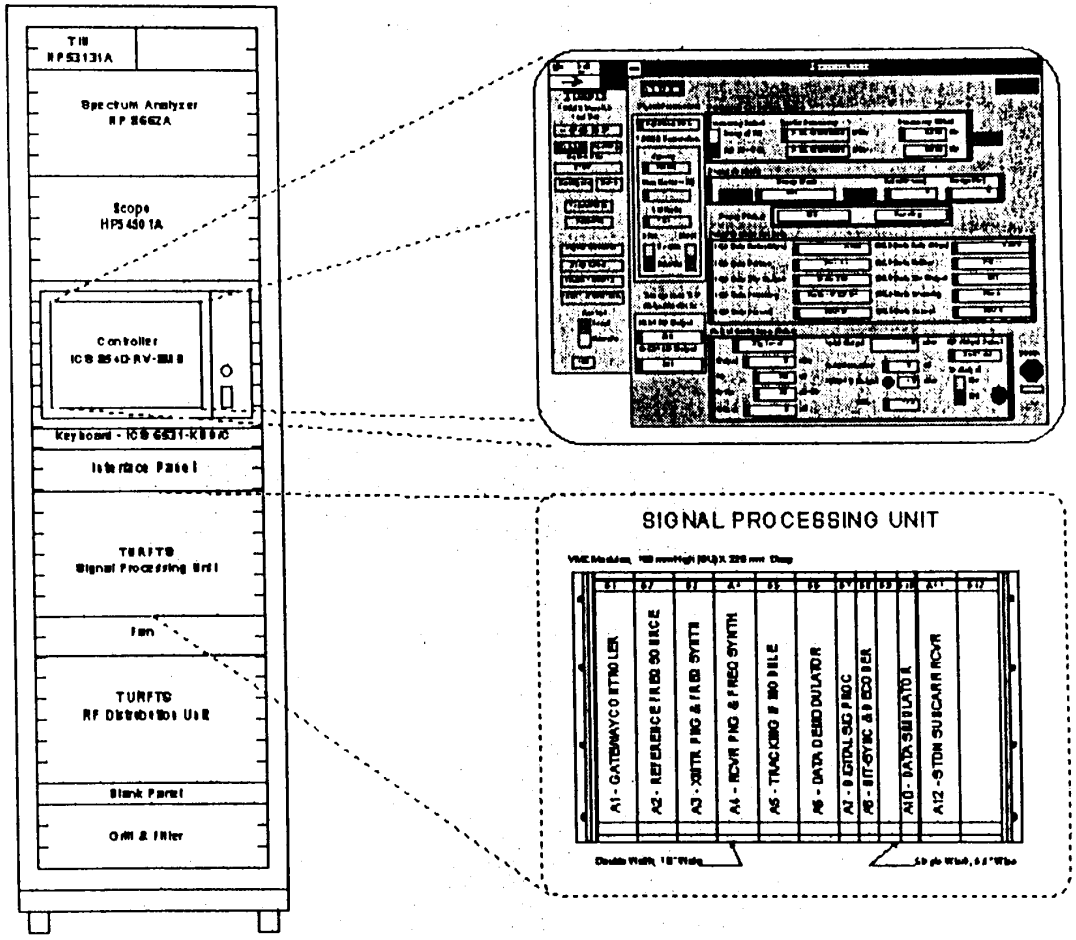


TURFTS Applications

Customer	Application
• LDBP	• I&T and Pre-Flight Testing
• NASA/MSFC	• Comm System Testing and I&T Support
• GSFC Engineering Labs	• Transponder Characterization, Anomaly Resolution and Special Tests
• EOS-AM, Landsat-7,TRMM & MIDEX Projects	• I&T and Pre-launch Testing
• GSFC CTV and RFSOC	• SN Compatibility Verification and Special Testing Support
• GRO Remote Terminal System (GRTS)	• Receiver - Operational Recovery of GRO data in TDRS ZOE • Transmitter - TDRS-Z MA Beamformer Calibration Signal

TDRSS

Transmitter

Transmitter

Quit/Close

TURFTS Transmitter

TX FAULT

Signal Parameters

R/L Mode 2

TDRSS Parameters

Agency: NASA

User Code (1-85): 1

I:Q Ratio: 1:4

I-PN: Enabled / Disabled

Q-PN

Transponder TLM Output Controls

I-Ch TLM Output: Off

Q-Ch TLM Output: Off

Antenna Switchbox

Select: Omni Fore

Loss: 23

Frequency Control and Status

Frequency Select	Center Frequency		Frequency Offset	
Indep of RX	2106.406250000	MHz	0.000	Hz
RX * 221/240	2106.406250000	MHz	0.000	Hz

Sweep Controls

Sweep Mode	Rate (Hz/sec)	Range (Hz)
Off	75	750

Sweep Status: Off / Running

Data Simulator Controls

I-Ch Data Rate (Kbps)	16.000	Q-Ch Data Rate (Kbps)	16.000
I-Ch Data Pattern	2^11 - 1	Q-Ch Data Pattern	2^11 - 1
I-Ch Data Sim Output	Data Simulator	Q-Ch Data Sim Output	Data Simulator
I-Ch Data Encoding	Rate 1/2 G2 Inv	Q-Ch Data Encoding	Rate 1/2 G2 Inv
I-Ch Data Format	NRZ-M	Q-Ch Data Format	NRZ-M

Output Control and Status

Sig Level

Output: 10 dBm

NF: 2.5 dB

C/No: 33.0 dB-Hz

Offset: 0 dB

Total Output: 10 dBm

Ext Attenuation: 0 dB

TURFTS Output: 10 dBm

ALC: 128

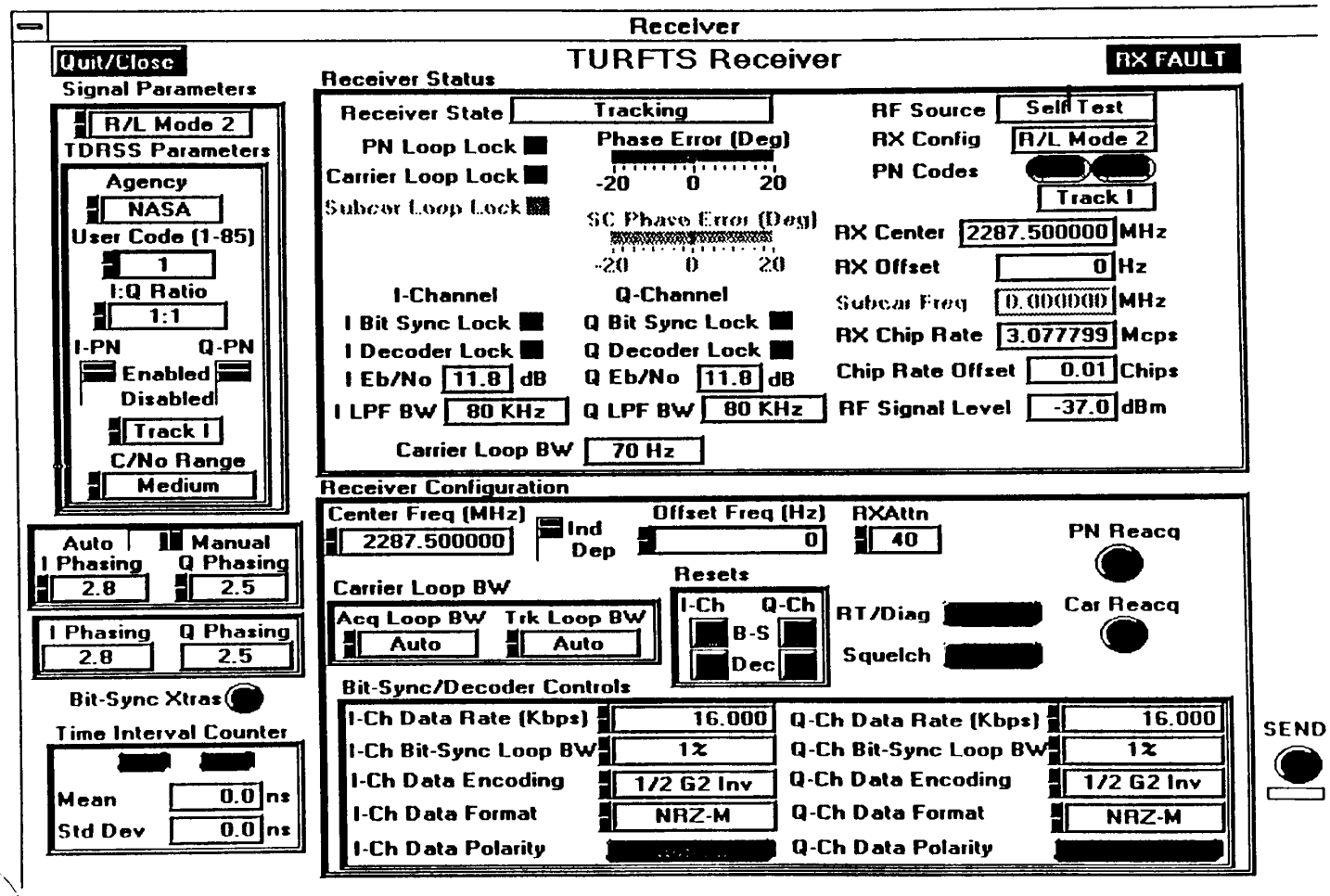
RF Output Select: Self Test

TX Output: On / Off

SEND

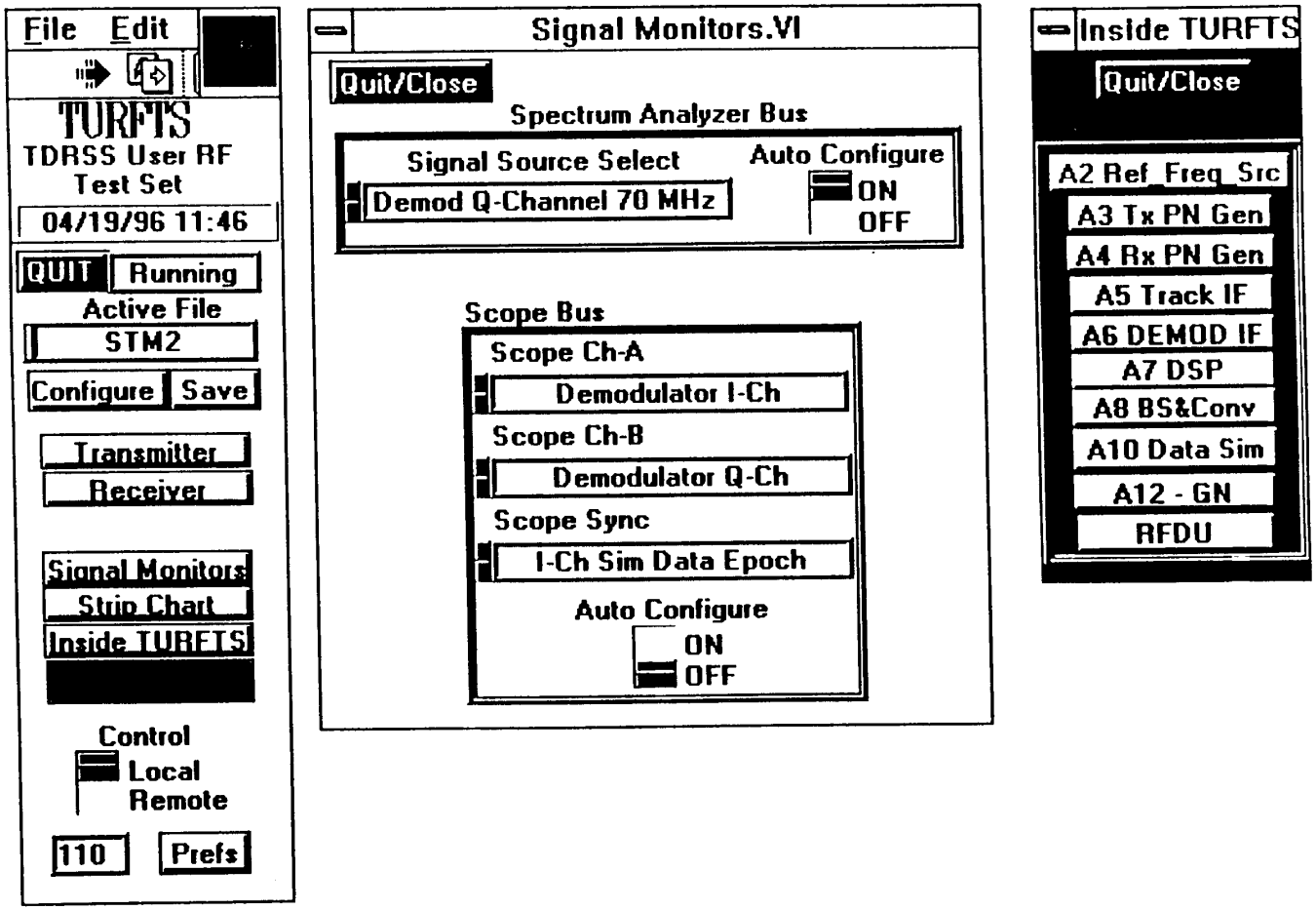
TDRSS

Receiver



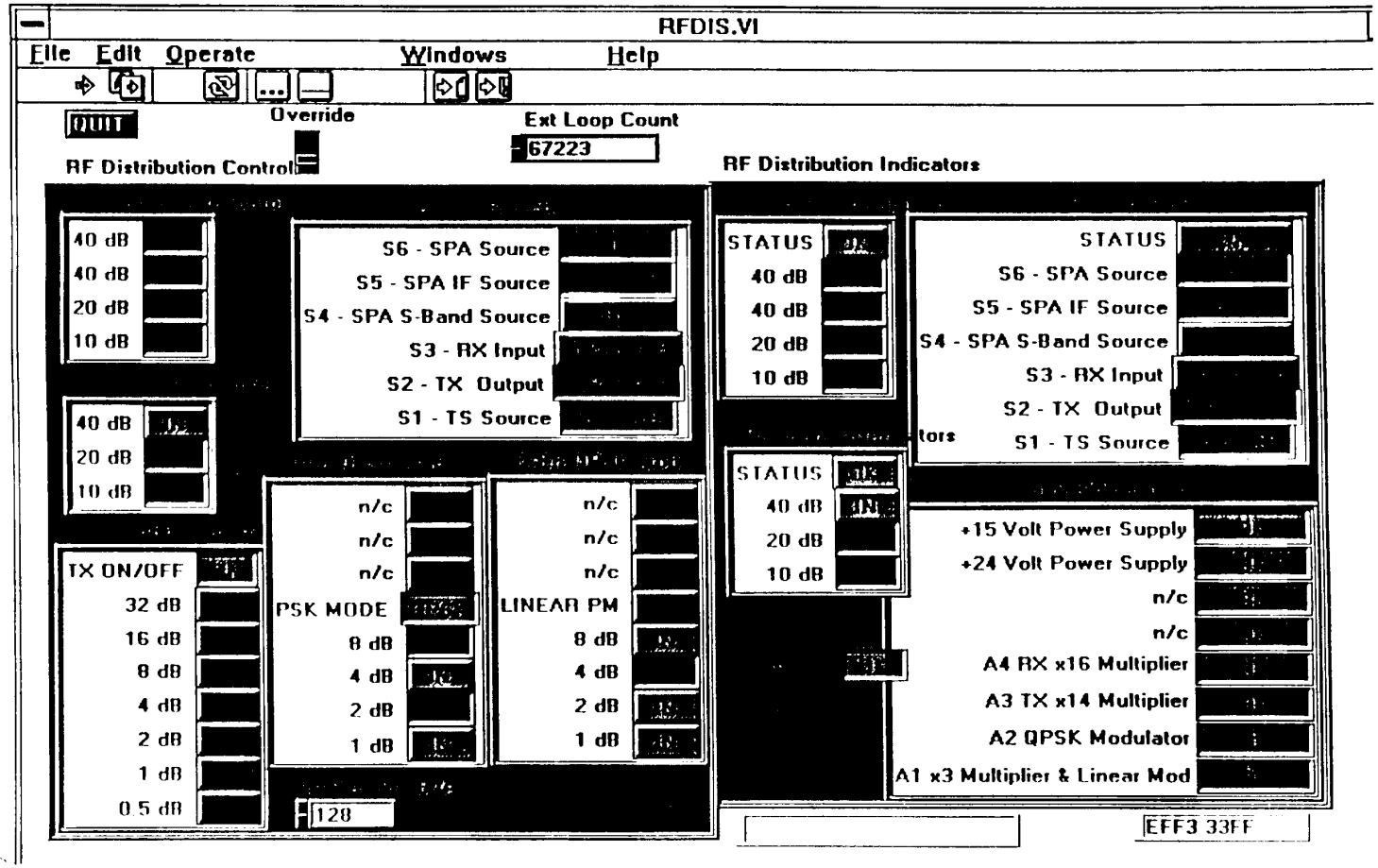
TDRSS

Signal Monitors.VI



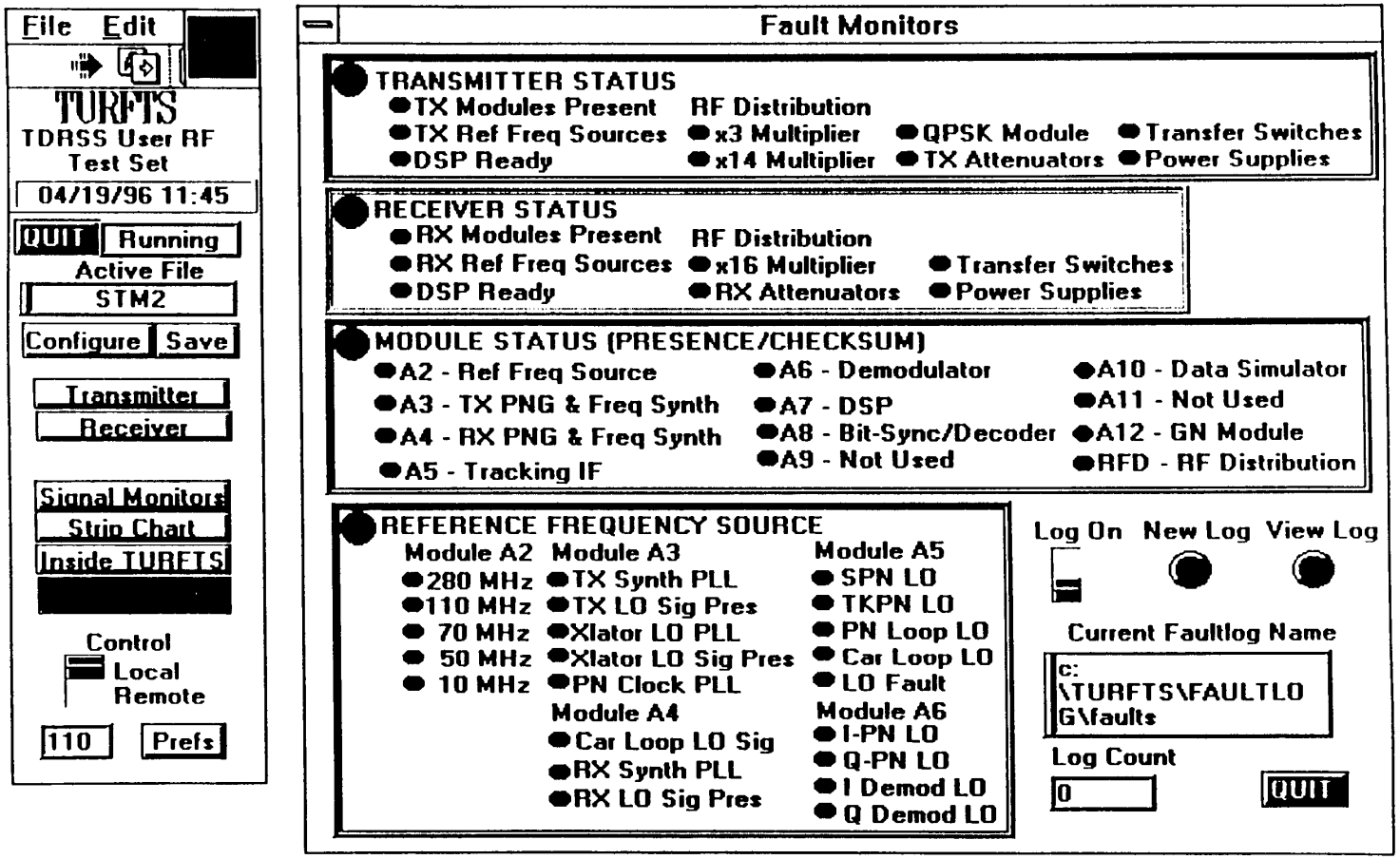
TDRSS

RFDIS.VI



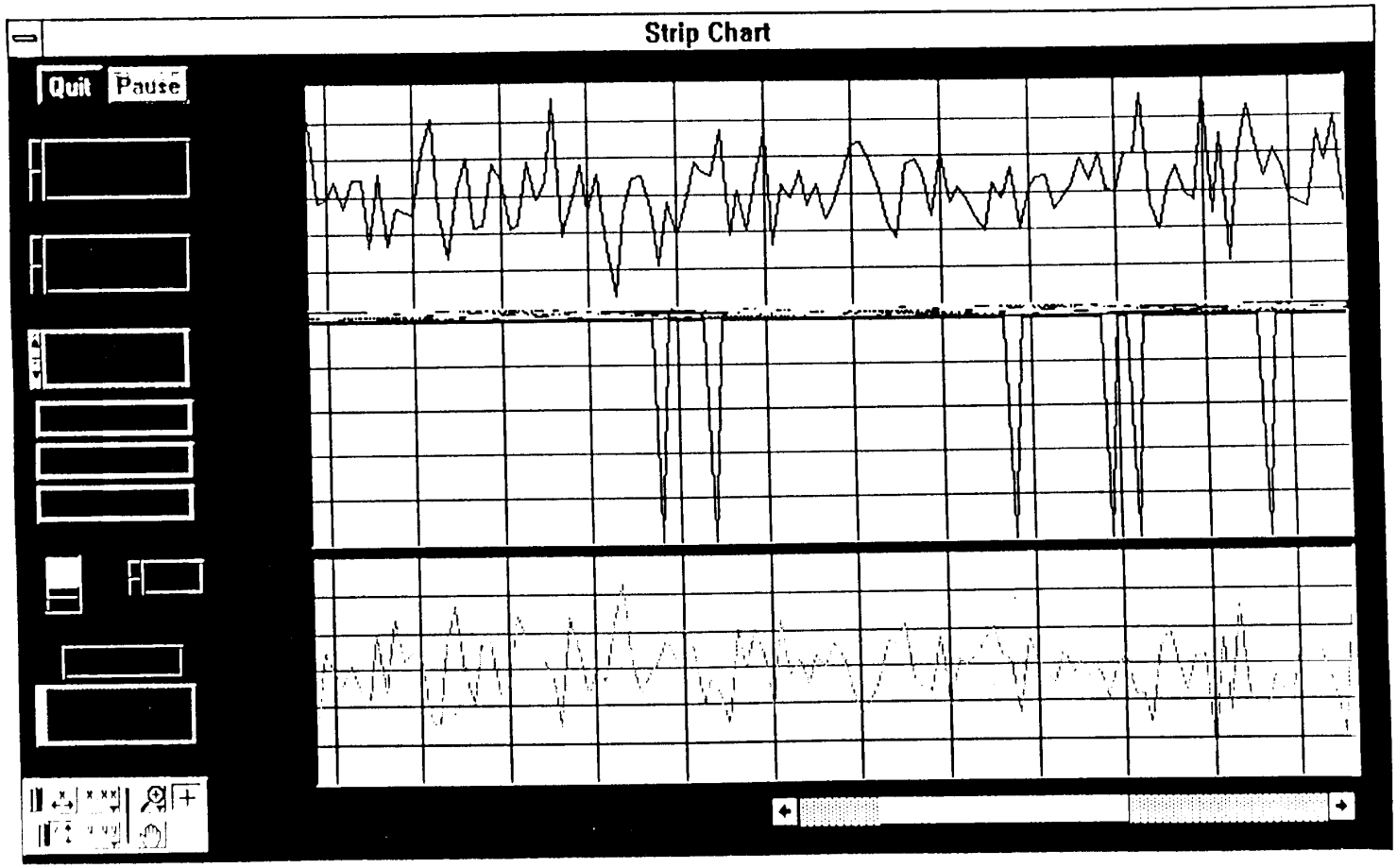
TDRSS

Fault Monitors



TDRSS

Strip Chart



TDRSS